



**LAMPIRAN-LAMPIRAN**

## Lampiran 1. Statistik Lalu Lintas Angkutan Udara Tahun 2010

Statistik Lalu Lintas Angkutan Udara															
Tahun 2010															
BULAN	INT	AIRCRAFT			PASSENGER			BAGGAGE (KG)			CARGO (KG)			P O S (KG)	
	DOM	ARR	DEP	LCL	ARR	DEP	TRS	ARR	DEP	TRS	ARR	DEP	TRS	ARR	DEP
Jan	INT	1,470	1,469		199,887	225,542	5,218	2,522,303	3,385,954	48,303	1,414,417	2,175,553	400,552	11,337	30,649
	DOM	1,918	1,920	75	191,726	207,112	6,988	1,567,346	2,008,826	65,465	1,255,256	641,932	413,735	48,257	30,718
Peb	INT	1,387	1,389		213,456	209,067	5,272	2,551,057	2,863,468	44,018	1,036,680	2,482,709	344,464	7,493	26,645
	DOM	1,673	1,673	35	181,643	177,614	6,423	1,451,483	1,542,766	78,617	1,172,049	515,482	456,134	47,307	32,717
Mar	INT	1,409	1,403		217,253	207,922	5,962	2,762,105	3,031,391	40,952	1,421,983	2,834,249	386,990	10,718	106,872
	DOM	1,798	1,796	26	193,742	190,026	6,085	1,555,813	1,668,021	56,867	1,209,858	600,668	379,499	50,391	29,213
Apr	INT	1,407	1,415		213,060	215,592	5,248	2,710,850	3,177,462	51,513	1,534,831	2,715,532	520,656	19,895	75,945
	DOM	1,828	1,837	59	199,078	203,897	2,832	1,526,679	1,773,138	90,752	1,372,225	568,286	342,547	51,145	45,447
Mei	INT	1,446	1,455		225,449	226,001	4,638	2,894,397	3,311,726	54,133	1,604,926	2,262,563	496,878	24,479	49,253
	DOM	1,936	1,941	26	213,242	217,324	3,155	1,668,148	1,890,739	82,076	1,334,654	593,614	354,857	39,519	27,286
Jun	INT	1,461	1,463	2	249,756	243,211	5,320	3,183,639	3,574,155	56,046	1,566,495	2,266,790	419,731	14,341	57,033
	DOM	2,038	2,064	46	230,831	228,384	2,731	1,847,834	2,012,765	92,633	1,424,010	610,208	339,875	44,431	34,730
Jul	INT	1,577	1,580		288,016	270,807	5,790	3,738,712	3,953,849	74,301	1,414,999	2,015,857	427,390	13,330	38,637
	DOM	2,170	2,189	52	258,998	265,817	5,052	2,132,713	2,454,758	95,516	1,447,188	721,086	349,189	47,054	27,397
Agt	INT	1,593	1,588		271,735	295,760	4,116	3,498,611	4,359,654	116,293	1,149,688	2,271,431	510,613	20,223	41,201
	DOM	2,023	2,026	89	200,706	217,881	3,529	1,672,485	1,900,785	154,567	1,568,682	743,887	408,342	30,464	26,035
Sep	INT	1,448	1,452		251,569	247,191	3,011	3,315,695	3,733,716	43,022	873,803	2,026,186	343,489	10,327	27,459
	DOM	2,227	2,221	35	238,337	240,724	4,682	2,022,954	2,189,990	114,325	1,248,361	537,446	307,290	40,181	23,364

Okt	INT	1,446	1,441		246,937	262,498	1,987	3,175,891	4,003,354	54,589	1,100,764	2,482,455	444,843	14,291	26,837
	DOM	2,256	2,262	41	248,312	249,723	5,721	2,012,748	2,121,378	183,148	1,631,424	679,869	408,073	49,246	30,181
Nop	INT	1,388	1,386	26	209,046	221,327	2,537	2,618,876	3,261,975	57,786	1,137,087	2,498,486	592,873	1,521	10,509
	DOM	2,084	2,094	55	228,264	229,352	7,687	1,806,736	1,933,985	142,629	1,441,124	698,280	363,476	38,847	24,940
Des	INT	1,531	1,526	51	237,776	206,650	4,727	2,952,094	2,884,108	36,963	1,245,492	2,146,026	455,106	4,532	28,059
	DOM	2,595	2,600	89	283,366	259,970	9,244	2,267,525	2,160,188	129,199	1,487,912	573,458	307,408	52,475	45,861
JUMLAH	INT	17,563	17,567	79	2,823,940	2,831,568	53,826	35,924,230	41,540,812	677,919	15,501,165	28,177,837	5,343,585	152,487	519,099
	DOM	24,546	24,623	628	2,668,245	2,687,824	64,129	21,532,464	23,657,339	1,285,794	16,592,743	7,484,216	4,430,425	539,317	377,889
JML	INT	35,209			5,709,334			78,142,961			49,022,587			671,586	
SELURUH	DOM	49,797			5,420,198			46,475,597			28,507,384			917,206	
TOTAL	INT+DOM	<b>85,006</b>			<b>11,129,532</b>			<b>124,618,558</b>			<b>77,529,971</b>			<b>1,588,792</b>	

Lampiran 2. Statistik Lalu Lintas Angkutan Udara Tahun 2011

<b>Statistik Lalu Lintas Angkutan Udara</b>															
<b>Tahun 2011</b>															
BULAN	INT	AIRCRAFT			PASSENGER			BAGGAGE (KG)			CARGO (KG)			P O S (KG)	
	DOM	ARR	DEP	LCL	ARR	DEP	TRS	ARR	DEP	TRS	ARR	DEP	TRS	ARR	DEP
Jan	INT	1,608	1,611		226,831	250,698	3,735	2,863,008	3,749,875	54,370	850,473	1,689,602	385,387	1,980	4,154
	DOM	2,580	2,611	23	241,418	266,312	7,926	1,922,433	2,275,174	178,626	1,307,867	600,332	241,661	72,811	25,524
Peb	INT	1,453	1,457		215,312	216,479	6,644	2,566,256	2,994,739	68,890	679,766	1,594,522	319,222	1,770	4,476
	DOM	2,218	2,224	23	228,452	222,564	8,279	1,713,706	1,793,979	220,629	1,198,576	515,754	338,961	40,853	22,521
Mar	INT	1,499	1,501		218,465	220,898	3,195	2,682,973	3,150,906	70,134	959,178	2,115,005	375,051	1,779	3,571
	DOM	2,453	2,477	11	232,021	229,500	6,713	1,716,457	1,773,511	214,396	1,402,728	693,715	344,627	44,542	21,698

Apr	INT	1,599	1,609		241,684	231,727	2,714	2,973,472	3,326,259	80,372	840,512	2,365,867	438,386	1,189	13,268	
	DOM	2,541	2,541	6	244,608	242,178	7,269	1,807,461	1,912,610	208,033	1,441,046	619,179	256,648	54,642	23,392	
Mei	INT	1,646	1,652		237,268	247,117	2,454	2,920,095	3,596,809	44,644	903,610	2,493,140	314,414	687	7,768	
	DOM	2,690	2,691	28	262,609	261,806	7,923	1,897,163	2,205,266	71,685	1,366,545	670,896	242,409	39,951	24,161	
Jun	INT	1,606	1,611		269,969	263,129	4,083	3,323,881	3,784,376	44,861	891,632	1,714,188	327,265	71	9,973	
	DOM	2,748	2,763	29	298,381	280,570	9,164	2,272,036	2,464,139	74,317	1,334,736	636,089	299,297	42,058	20,464	
Jul	INT	1,771	1,763		304,275	291,237	3,471	3,818,608	4,217,426	49,672	1,319,786	1,923,779	330,193	113	7,643	
	DOM	2,866	2,875	44	312,529	322,004	9,837	2,469,062	2,908,768	86,664	1,537,959	653,017	301,726	85,809	28,550	
Agt	INT	1,720	1,728		276,359	302,213	3,351	3,491,705	4,502,922	42,706	1,046,623	1,918,638	332,935	460	8,115	
	DOM	2,597	2,596	25	255,878	241,207	8,427	2,120,486	2,252,510	66,725	1,400,537	684,732	171,393	87,508	33,944	
Sep	INT	1,674	1,674		272,539	263,715	3,585	3,459,276	3,939,027	51,378	1,018,055	1,536,264	322,947	1,070	11,238	
	DOM	2,738	2,740	85	283,522	299,221	8,503	2,206,217	2,856,509	72,254	1,365,392	618,636	300,548	50,257	22,347	
Okt	INT	1,711	1,721		268,770	289,824	2,617	3,296,580	4,308,778	35,287	1,192,147	2,399,084	491,828	1,868	14,266	
	DOM	2,801	2,812	52	285,235	287,050	9,162	2,119,474	2,561,139	75,785	1,745,302	714,239	363,579	55,229	25,131	
Nop	INT	1,686	1,682		248,169	253,909	2,779	2,966,204	3,727,876	44,761	1,202,323	2,328,142	444,906	9,747	27,373	
	DOM	2,735	2,733	57	291,316	288,037	8,165	2,126,576	2,541,171	70,467	1,625,968	752,094	289,192	58,218	24,351	
Des	INT	1,767	1,760		274,798	248,499	4,532	3,315,762	3,471,148	55,899	1,264,101	2,328,482	429,927	18,664	23,334	
	DOM	2,908	2,902	39	317,942	300,026	9,076	2,365,145	2,744,168	80,722	1,837,448	771,913	355,568	63,015	32,794	
JUMLAH	INT	19,740	19,769	0	3,054,439	3,079,445	43,160	37,677,820	44,770,141	642,974	12,168,206	24,406,713	4,512,461	39,398	135,179	
	DOM	31,875	31,965	422	3,253,911	3,240,475	100,444	24,736,216	28,288,944	1,420,303	17,564,104	7,930,596	3,505,609	694,893	304,877	
JML	INT	39,509			6,177,044			83,090,935			41,087,380			174,577		
SELURUH	DOM	64,262			6,594,830			54,445,463			29,000,309			999,770		
TOTAL	INT+DOM	103,771			12,771,874			137,536,398			70,087,689			1,174,347		

Lampiran 3. Statistik Lalu Lintas Angkutan Udara Tahun 2012

<b>Statistik Lalu Lintas Angkutan Udara</b>															
<b>Tahun 2012</b>															
<b>BULAN</b>	<b>INT</b>	<b>AIRCRAFT</b>			<b>PASSENGER</b>			<b>BAGGAGE (KG)</b>			<b>CARGO (KG)</b>			<b>P O S (KG)</b>	
	<b>DOM</b>	<b>ARR</b>	<b>DEP</b>	<b>LCL</b>	<b>ARR</b>	<b>DEP</b>	<b>TRS</b>	<b>ARR</b>	<b>DEP</b>	<b>TRS</b>	<b>ARR</b>	<b>DEP</b>	<b>TRS</b>	<b>ARR</b>	<b>DEP</b>
Jan	INT	1,894	1,894		276,090	306,154	4,465	3,281,560	4,402,010	56,508	923,727	2,099,812	285,233	7,738	16,997
	DOM	2,819	2,825	19	282,209	309,316	7,179	2,138,335	2,914,978	73,745	1,443,053	721,088	267,936	57,554	27,372
Peb	INT	1,649	1,638		230,246	231,378	3,826	2,702,308	3,255,959	48,563	1,127,306	1,834,707	422,714	17,158	22,043
	DOM	2,581	2,579	25	253,433	245,835	8,670	1,812,213	2,119,871	78,418	1,300,148	528,507	281,489	57,689	28,509
Mar	INT	1,638	1,632		249,178	245,706	4,087	2,947,722	3,547,134	40,403	1,293,019	2,014,050	499,714	23,629	30,225
	DOM	2,744	2,733	28	274,715	265,782	10,247	1,947,932	2,278,513	81,653	1,241,186	473,662	253,944	53,727	30,112
Apr	INT	1,672	1,678		247,996	248,595	3,298	2,961,592	3,539,473	45,483	1,043,893	2,229,325	396,176	34,140	27,653
	DOM	2,902	2,885	46	284,237	288,687	9,647	1,955,437	2,421,051	93,910	1,260,049	510,225	236,504	54,463	38,834
Mei	INT	1,672	1,673		245,130	248,560	2,358	2,964,725	3,575,414	34,237	1,092,062	2,043,244	350,274	29,865	30,608
	DOM	2,992	2,987	44	304,036	300,476	10,437	2,111,184	2,546,292	85,175	1,300,506	562,374	322,430	52,289	31,981
Jun	INT	1,653	1,645		273,887	266,419	2,876	3,337,735	3,805,682	41,467	1,099,869	1,749,300	446,926	31,679	29,993
	DOM	3,062	3,053	26	337,398	316,086	11,470	2,495,400	2,702,902	89,659	1,378,682	658,764	435,897	46,263	31,479
Jul	INT	1,753	1,765		302,281	293,504	3,383	3,784,924	4,230,787	45,283	965,239	1,866,091	363,120	46,274	28,955
	DOM	3,044	3,051	23	336,374	344,392	10,454	2,604,536	3,196,843	97,600	1,526,751	807,468	315,117	33,902	34,569
Agt	INT	1,737	1,737		291,544	309,139	3,051	3,690,318	4,552,126	54,063	771,965	1,510,380	397,818	31,269	34,282
	DOM	3,155	3,146	36	329,946	334,517	10,025	2,680,520	3,232,058	79,741	1,240,645	643,089	397,028	26,443	35,862
Sep	INT	1,663	1,666		279,652	276,904	2,292	3,461,197	4,065,262	36,422	1,022,703	1,661,679	544,750	49,783	27,370
	DOM	3,061	3,064	28	332,820	322,599	11,876	2,412,725	2,792,254	113,333	1,524,616	664,935	353,465	41,411	28,118



Okt	INT	1,693	1,695		277,892	298,553	2,512	3,351,103	4,311,511	51,904	974,874	2,173,547	558,175	44,472	16,299
	DOM	3,169	3,168	47	347,368	342,240	11,400	2,464,763	2,910,534	103,440	1,703,646	851,411	219,665	36,562	34,541
Nop	INT	1,646	1,656		249,507	260,506	2,944	2,915,353	3,688,921	56,815	1,028,569	2,014,213	555,535	36,190	14,366
	DOM	3,267	3,261	44	347,973	339,127	9,381	2,342,054	2,800,313	79,078	1,492,302	708,205	270,533	29,986	38,056
Des	INT	1,728	1,727	0	275,750	249,066	3,207	3,237,066	3,422,253	57,945	1,420,162	2,257,747	583,857	42,371	13,646
	DOM	3,403	3,397	44	388,859	350,840	13,969	2,847,109	3,097,881	76,991	1,684,571	699,551	422,261	32,863	34,912
JUMLAH	INT	20,398	20,406	0	3,199,153	3,234,484	38,299	38,635,603	46,396,532	569,093	12,763,388	23,454,095	5,404,292	394,568	292,437
	DOM	36,199	36,149	410	3,819,368	3,759,897	124,755	27,812,208	33,013,490	1,052,743	17,096,155	7,829,279	3,776,269	523,152	394,345
JML	INT	40,804			6,471,936			85,601,228			41,621,775			687,005	
SELURUH	DOM	72,758			7,704,020			61,878,441			28,701,703			917,497	
TOTAL	INT+DOM	<b>113,562</b>			<b>14,175,956</b>			<b>147,479,669</b>			<b>70,323,478</b>			<b>1,604,502</b>	

Lampiran 4. Statistik Lalu Lintas Angkutan Udara Tahun 2013

<b>Statistik Lalu Lintas Angkutan Udara</b>															
<b>Tahun 2013</b>															
BULAN	INT	AIRCRAFT			PASSENGER			BAGGAGE (KG)			CARGO (KG)			P O S (KG)	
	DOM	ARR	DEP	LCL	ARR	DEP	TRS	ARR	DEP	TRS	ARR	DEP	TRS	ARR	DEP
Jan	INT	1,747	1,750		238,473	265,327	6,441	2,761,333	3,936,445	45,747	1,232,103	1,666,873	301,418	50,656	9,737
	DOM	3,435	3,436	36	316,758	333,940	12,199	2,238,115	3,086,190	63,816	1,025,958	517,200	367,843	22,539	34,708
Peb	INT	1,597	1,597		244,991	239,351	3,620	2,581,474	2,967,733	9,876	886,037	1,591,330	330,113	44,650	16,679
	DOM	2,838	2,840	35	295,008	287,521	6,310	1,859,712	2,188,818	8,386	1,129,851	402,244	375,112	24,915	19,222
Mar	INT	1,667	1,664		265,086	250,694	3,936	3,095,499	3,431,435	419	1,239,571	1,838,641	522,512	45,880	12,281
	DOM	3,229	3,235	82	335,016	323,799	7,044	2,331,106	2,694,631	4,572	1,096,900	456,120	472,907	26,933	19,230

Apr	INT	1,652	1,676		259,120	260,343	3,711	3,173,816	3,691,461	573	1,403,883	2,070,806	649,584	80,244	13,658	
	DOM	3,104	3,106	34	317,813	316,103	8,243	2,328,153	2,783,203	5,835	1,179,177	521,600	483,922	28,787	29,833	
Mei	INT	1,712	1,713		271,153	276,328	2,629	3,308,150	3,932,944	150	773,365	1,771,359	610,984	65,077	13,762	
	DOM	3,388	3,382	66	354,944	347,563	8,054	2,581,277	3,075,858	10,100	1,268,400	511,011	400,349	26,643	26,449	
Jun	INT	1,751	1,758		303,857	295,065	3,916	3,582,421	4,085,518	351	844,682	1,838,843	458,917	59,930	11,524	
	DOM	3,431	3,434	77	411,924	391,421	10,008	3,071,493	3,533,078	17,445	1,163,948	536,874	516,800	25,141	27,577	
Jul	INT	1,864	1,865	3	328,973	316,313	2,733	4,005,872	4,392,634	0	962,087	1,902,965	430,952	67,534	7,420	
	DOM	3,158	3,156	55	337,289	340,779	9,974	2,655,136	3,173,598	23,664	1,268,452	633,380	462,277	13,032	41,517	
Agt	INT	2,030	2,029		328,570	337,506	6,119	4,041,768	4,792,043	0	731,990	1,113,605	402,156	64,946	2,832	
	DOM	3,520	3,521	76	406,771	393,681	13,206	3,337,410	3,900,829	19,817	960,950	352,285	342,877	7,772	23,983	
Sep	INT	1,957	1,957		323,815	324,021	3,112	3,941,633	4,577,300	0	828,157	1,467,019	461,287	53,343	5,006	
	DOM	3,390	3,386	76	379,133	374,538	9,740	2,807,550	3,361,398	9,986	1,196,074	577,375	282,542	23,724	28,191	
Okt	INT	2,015	2,023		297,060	314,013	2,569	3,603,869	4,376,297	0	925,604	2,040,109	489,653	84,587	3,409	
	DOM	3,149	3,150	158	356,315	352,947	7,477	2,662,265	3,213,213	5,424	1,134,080	549,536	285,048	5,781	26,251	
Nop	INT	1,963	1,963		279,722	288,504		3,153,497	3,842,690		1,120,721	2,068,399	557,965	76,303	3,203	
	DOM	3,401	3,399	96	374,706	375,921	2,013	2,587,040	3,172,435	4,418	1,385,356	614,159	392,998	25,071	33,467	
Des	INT	2,098	2,103		328,986	299,432		3,779,101	3,773,646		935,493	2,204,049	395,157	5,781	5,761	
	DOM	3,744	3,736	54	434,314	405,509	730	3,214,908	3,577,760	10,017	1,578,962	599,949	370,743	70,369	44,501	
JUMLAH	INT	22,053	22,098	3	3,469,806	3,466,897	38,786	41,028,433	47,800,146	57,116	11,883,693	21,573,998	5,610,698	698,931	105,272	
	DOM	39,787	39,781	845	4,319,991	4,243,722	94,998	31,674,165	37,761,011	183,480	14,388,108	6,271,733	4,753,418	300,707	354,929	
JML	INT	44,151			6,975,489			88,885,695			39,068,389			804,203		
SELURUH	DOM	80,413			8,658,711			69,618,656			25,413,259			655,636		
TOTAL	INT+DOM	124,564			15,634,200			158,504,351			64,481,648			1,459,839		

## Lampiran 5. Statistik Lalu Lintas Angkutan Udara Tahun 2014

<b>Statistik Lalu Lintas Angkutan Udara</b>															
<b>Tahun 2014</b>															
<b>BULAN</b>	<b>INT</b>	<b>AIRCRAFT</b>			<b>PASSENGER</b>			<b>BAGGAGE (KG)</b>			<b>CARGO (KG)</b>			<b>P O S (KG)</b>	
	<b>DOM</b>	<b>ARR</b>	<b>DEP</b>	<b>LCL</b>	<b>ARR</b>	<b>DEP</b>	<b>TRS</b>	<b>ARR</b>	<b>DEP</b>	<b>TRS</b>	<b>ARR</b>	<b>DEP</b>	<b>TRS</b>	<b>ARR</b>	<b>DEP</b>
Jan	INT	2,237	2,234		322,031	345,360		3,544,545	4,522,707		1,045,822	1,582,051	388,934	46,963	1,139
	DOM	3,624	3,620	81	364,588	399,598	851	2,659,405	3,740,372	14,392	1,270,207	584,779	421,665	77,565	34,522
Peb	INT	2,011	2,014		300,180	316,019		3,295,895	3,891,654		795,028	1,413,510	243,286	71,735	2
	DOM	2,857	2,857	86	311,109	321,473	478	2,244,610	2,828,482	8,041	1,112,805	310,769	310,759	64,332	27,659
Mar	INT	2,063	2,060		296,936	311,799	65	3,313,528	4,011,837	20,887	1,248,724	2,244,266	524,567	63,744	0
	DOM	3,125	3,118	96	315,131	332,069	2,150	2,285,434	2,939,884	63,806	1,422,084	396,546	444,082	68,667	34,061
Apr	INT	2,139	2,147		324,966	309,896		3,758,650	4,078,742		1,095,727	2,482,786	418,395	73,672	33
	DOM	3,096	3,099	111	338,781	330,060		2,464,934	2,834,262		1,212,544	416,095	375,041	65,093	23,299
Mei	INT	2,174	2,169		322,839	323,569		3,723,445	4,252,857		1,191,319	2,181,171	456,324	71,805	174
	DOM	3,383	3,374	73	383,221	381,124	901	2,800,085	3,349,909	9,948	1,410,853	497,721	423,464	61,599	30,842
Jun	INT	2,120	2,123		360,101	355,702		4,048,099	4,607,834		1,224,398	1,738,579	302,898	45,847	6,394
	DOM	3,239	3,243	87	391,900	407,395		3,002,759	3,574,710		1,288,462	527,025	380,416	146,675	30,408
Jul	INT	2,221	2,227	2	386,085	376,445		4,651,595	5,039,552		864,195	1,688,309	233,190	46,103	805
	DOM	3,051	3,051	55	366,400	348,361	750	3,051,887	3,199,825	5,744	1,287,086	213,568	216,031	125,907	896
Agt	INT	2,260	2,258	0	385,668	401,885	0	4,545,164	5,314,579	0	1,004,165	1,518,028	237,824	38,952	3
	DOM	3,427	3,435	97	431,532	457,898	4,612	3,385,234	4,517,775	61,236	1,449,974	144,774	259,045	113,280	437
Sep	INT	2,147	2,147		373,435	373,670	535	4,425,521	5,043,333	0	1,216,945	2,070,542	392,526	56,571	61
	DOM	3,202	3,192	79	375,687	377,827	5,437	2,795,131	3,442,262	48,459	1,422,432	136,839	313,038	165,124	0



Okt	INT	2,193	2,192	0	360,256	387,137	433	4,162,961	5,263,393	3,172	991,122	1,623,457	390,874	79,313	557
	DOM	3,229	3,205	71	396,793	389,124	5,416	2,762,773	3,331,864	50,269	1,719,868	128,903	188,024	169,803	9
Nop	INT	2,058	2,061		311,934	327,717	253	3,496,414	4,327,568	6,461	408,107	1,727,136	0	33	0
	DOM	3,135	3,143	89	379,872	380,711	5,432	2,530,006	3,157,832	9,915	318,886	173,848	526	117,378	938
Des	INT	2,220	2,227		356,037	321,396	377	4,159,949	4,074,884	6,950	311,023	1,325,572	0	10	0
	DOM	3,381	3,376	69	434,034	390,913	5,728	3,185,141	3,391,338	51,434	166,374	70,014	971	111,981	6,374
JUMLAH	INT	25,843	25,859	2	4,100,468	4,150,595	1,663	47,125,766	54,428,940	37,470	11,396,575	21,595,407	3,588,818	594,748	9,168
	DOM	38,749	38,713	994	4,489,048	4,516,553	31,755	33,167,399	40,308,515	323,244	14,081,575	3,600,881	3,333,062	1,287,404	189,445
JML	INT	51,702			8,252,726			101,592,176			36,580,800			603,916	
SELURUH	DOM	78,456			9,037,356			73,799,158			21,015,518			1,476,849	
TOTAL	INT+DOM	130,158			17,290,082			175,391,334			57,596,318			2,080,765	

Lampiran 6. Statistik Lalu Lintas Angkutan Udara Tahun 2015

## Statistik Lalu Lintas Angkutan Udara

Tahun 2015

BULAN	INT	AIRCRAFT			PASSENGER			BAGGAGE (KG)			CARGO (KG)			P O S (KG)	
	DOM	ARR	DEP	LCL	ARR	DEP	TRS	ARR	DEP	TRS	ARR	DEP	TRS	ARR	DEP
Jan	INT	2,214	2,220		309,615	351,750	418	3,587,578	4,784,262	8,718	271,302	1,112,108	0	23	0
	DOM	3,077	3,071	62	311,636	355,290	3,628	2,313,668	3,360,621	69,242	768,247	467,991	7	92,253	1,131
Peb	INT	2,052	2,059	0	322,216	333,752	684	3,455,773	4,069,150	8,786	202,642	1,399,621	0	0	0
	DOM	2,751	2,744	110	300,620	292,713	4,701	2,114,639	2,472,421	45,990	682,701	354,186	0	74,092	303
Mar	INT	2,007	2,005	0	311,644	315,149	0	3,574,808	4,049,189	0	189,994	1,379,682	0	0	0

	DOM	2,942	2,958	40	309,211	315,747	5,608	2,270,125	2,677,511	56,156	808,866	391,983	0	82,935	378	
Apr	INT	2,128	2,133	0	327,145	325,964	1	3,752,135	4,237,891	0	329,340	1,292,725	0	13	0	
	DOM	3,042	3,047	31	339,866	334,020	5,094	2,353,561	2,859,619	47,254	829,403	475,653	1,460	112,341	2	
Mei	INT	2,129	2,129		347,633	346,605	1,016	3,996,214	4,585,553	19,623	334,191	989,592	0	110	0	
	DOM	3,223	3,224	61	380,972	375,617	5,384	2,662,609	3,218,386	53,427	817,730	451,322	10	102,319	1,970	
Jun	INT	2,112	2,113		376,437	370,231	276	4,307,662	4,796,488	13,601	328,064	938,724	3,719	204	0	
	DOM	3,044	3,044	76	358,808	356,184	5,393	2,652,947	3,054,396	52,852	693,042	469,936	5,102	102,977	0	
Jul	INT	2,210	2,235	0	408,936	393,929	25	4,941,661	5,174,959	1,161	309,439	707,603	0	34	0	
	DOM	3,109	3,086	55	379,299	380,555	5,077	3,219,900	3,682,730	55,763	377,939	324,954	0	90,899	0	
Agt	INT	2,277	2,299	0	399,757	440,747	166	4,767,989	5,896,365	0	300,174	851,758	0	1,151,932	30	
	DOM	3,285	3,268	62	384,913	404,744	6,373	3,079,993	3,776,101	67,887	195,375	283,842	0	67,005	0	
Sep	INT	2,221	2,214	0	392,030	381,210	0	4,605,290	5,388,014	0	260,136	705,848	0	135	11	
	DOM	3,054	3,056	81	346,839	327,998	14,875	2,627,153	3,150,642	3,409	1,038,541	576,018	0	75,920	0	
Okt	INT	2,279	2,283	0	380,956	410,377	0	4,396,022	5,583,082	69	341,266	1,180,152	0	199	13,474	
	DOM	3,238	3,235	55	401,273	355,265	13,115	2,833,946	3,406,047	10,329	1,002,613	606,197	0	69,970	0	
Nop	INT	1,847	1,852	0	268,822	294,252	0	3,056,507	3,954,033	0	359,675	1,016,468	0	0	9,924	
	DOM	2,839	2,825	57	326,278	316,929	12,576	2,215,872	2,841,483	28,153	812,581	534,107	0	0	0	
Des	INT	2,370	2,357	0	388,049	344,698	2	4,508,278	4,513,150	75	354,128	1,090,558	0	77	5	
	DOM	3,350	3,344	54	435,918	377,617	17,445	3,176,816	3,604,959	34,990	1,011,517	675,446	35	84,050	0	
JUMLAH	INT	25,846	25,899	0	4,233,240	4,308,664	2,588	48,949,917	57,032,136	52,033	3,580,351	12,664,839	3,719	1,152,727	23,444	
	DOM	36,954	36,902	744	4,275,633	4,192,679	99,269	31,521,229	38,104,916	525,452	9,038,555	5,611,635	6,614	954,761	3,784	
JML	INT	51,745			8,544,492			106,034,086			16,248,909			1,176,171		
SELURUH	DOM	74,600			8,567,581			70,151,597			14,656,804			958,545		
TOTAL	INT+DOM	126,345			17,112,073			176,185,683			30,905,713			2,134,716		

## Lampiran 7. Statistik Lalu Lintas Angkutan Udara Tahun 2016

<b>Statistik Lalu Lintas Angkutan Udara</b>															
<b>Tahun 2016</b>															
<b>BULAN</b>	<b>INT</b>	<b>AIRCRAFT</b>			<b>PASSENGER</b>			<b>BAGGAGE (KG)</b>			<b>CARGO (KG)</b>			<b>P O S (KG)</b>	
	<b>DOM</b>	<b>ARR</b>	<b>DEP</b>	<b>LCL</b>	<b>ARR</b>	<b>DEP</b>	<b>TRS</b>	<b>ARR</b>	<b>DEP</b>	<b>TRS</b>	<b>ARR</b>	<b>DEP</b>	<b>TRS</b>	<b>ARR</b>	<b>DEP</b>
Jan	INT	2,472	2,491	0	377,929	412,892	59	4,281,114	5,519,739	305	510,069	1,010,517	0	1	2
	DOM	3,295	3,278	58	359,951	377,400	17,853	2,576,678	3,630,872	22,831	878,208	493,339	0	73,398	0
Peb	INT	2,426	2,423	0	364,904	393,501	0	3,839,907	4,796,771	0	323,821	916,311	0	59	5
	DOM	3,043	3,043	49	348,410	337,308	16,959	2,401,226	2,983,022	2,685	797,955	411,450	0	54,493	0
Mar	INT	2,296	2,301	0	364,419	347,728	132	4,091,154	4,419,135	20,617	396,532	1,458,941	0	23	1
	DOM	3,269	3,267	68	390,195	388,281	2,685	2,641,977	3,177,616	36,259	966,483	636,167	0	84,704	0
Apr	INT	2,317	2,305	0	381,225	384,729	25	4,245,276	5,019,081	2,704	463,941	1,444,937	0	5	203
	DOM	3,239	3,234	50	386,318	349,122	4,886	2,587,433	3,187,519	22,396	1,067,545	737,387	0	75,408	0
Mei	INT	2,384	2,384	0	405,690	417,972	0	4,554,884	5,450,401	0	488,424	1,276,238	0	9	2,257
	DOM	3,450	3,454	56	451,226	427,732	4	3,051,070	3,979,927	0	1,149,585	793,105	0	18,471	57,359
Jun	INT	2,308	2,313	0	417,955	414,137	28	4,753,822	5,229,076	2	379,691	1,339,774	0	57	25
	DOM	3,103	3,117	49	383,007	381,772	3,957	2,870,407	3,206,898	41,269	1,119,451	768,586	0	109,947	0
Jul	INT	2,585	2,590	0	481,383	465,219	92	5,770,910	5,885,417	31,266	284,720	1,126,198	159	29	3,478
	DOM	3,556	3,555	52	500,963	511,350	2,797	4,139,715	4,896,236	43,190	817,210	572,358	246	27	66,133
Agt	INT	2,587	2,589	0	447,860	487,772	52	5,273,228	6,390,188	0	470,101	1,231,382	0	84	354
	DOM	3,423	3,423	110	450,042	475,352	4,124	3,722,258	4,494,712	41,137	1,009,590	669,282	0	0	95,913
Sep	INT	2,378	2,380	0	439,758	446,997	2	5,223,902	5,900,404	0	625,214	1,879,628	0	11,915	36,103
	DOM	3,326	3,317	116	412,801	430,794	3,745	3,111,990	3,751,908	33,935	905,757	992,512	0	2,897	105,514

Okt	INT	2,414	2,416	0	426,343	455,097	68	4,940,050	6,017,261	854	880,288	3,498,006	0	18,205	70,016
	DOM	3,485	3,476	141	416,044	430,997	3,780	3,004,210	3,626,944	39,713	1,201,014	1,851,532	0	6,597	61,323
Nop	INT	2,326	2,329	0	380,260	399,027	145	4,227,509	5,163,433	1,866	782,808	3,800,580	0	6,137	63,329
	DOM	3,382	3,383	30	403,606	412,134	4,221	2,764,445	3,412,317	40,151	1,279,376	1,596,051	0	10,187	3,191
Des	INT	2,492	2,494	0	441,181	407,489	4	5,132,790	5,085,518	1,175	791,573	3,187,066	0	8,982	82,100
	DOM	3,578	3,573	52	475,110	455,970	3,445	3,586,011	3,928,739	38,636	1,117,587	1,220,834	0	10,884	0
JUMLAH	INT	28,985	29,015	0	4,928,907	5,032,560	607	56,334,546	64,876,424	58,789	6,397,182	22,169,578	159	45,506	257,873
	DOM	40,149	40,120	831	4,977,673	4,978,212	68,456	36,457,420	44,276,710	362,202	12,309,761	10,742,603	246	447,013	389,433
JML	INT	58,000			9,962,074			121,269,759			28,566,919			303,379	
SELURUH	DOM	81,100			10,024,341			81,096,332			23,052,610			836,446	
TOTAL	INT+DOM	139,100			19,986,415			202,366,091			51,619,529			1,139,825	

Lampiran 8. Statistik Lalu Lintas Angkutan Udara Tahun 2017

Statistik Lalu Lintas Angkutan Udara															
Tahun 2017															
BULAN	INT	AIRCRAFT			PASSENGER			BAGGAGE (KG)			CARGO (KG)			P O S (KG)	
	DOM	ARR	DEP	LCL	ARR	DEP	TRS	ARR	DEP	TRS	ARR	DEP	TRS	ARR	DEP
Jan	INT	2,573	2,569	0	447,287	469,137	0	4,976,674	5,992,463	0	663,154	2,483,721	0	1,158	68,017
	DOM	3,519	3,510	34	387,804	448,684	2,983	2,829,969	4,087,736	36,422	988,605	1,205,390	0	0	4,521
Peb	INT	2,299	2,291	0	380,101	420,148	196	4,151,917	5,066,249	10,417	525,822	2,043,260	0	1,729	29,536
	DOM	3,012	3,041	33	332,745	357,390	3,333	2,361,508	2,940,785	34,401	887,515	981,434	0	0	1,783
Mar	INT	2,391	2,376	0	403,590	418,582	68	4,594,234	5,359,142	4,976	717,002	2,473,820	0	2	36,912

	DOM	3,227	3,247	31	375,962	378,507	4,023	2,629,155	3,094,367	35,874	1,243,027	970,127	0	0	0	
Apr	INT	2,520	2,505	0	459,028	454,882	27	5,337,535	5,862,494	7,373	2,261,376	2,826,924	0	1,944	24,077	
	DOM	3,276	3,288	21	415,931	421,255	3,275	2,954,784	3,573,094	32,364	1,156,530	1,742,164	0	2,616	0	
Mei	INT	2,640	2,636	0	461,944	474,462	244	5,282,697	6,061,653	3,057	1,516,924	2,662,530	0	755	33,808	
	DOM	3,436	3,445	61	408,137	442,595	3,367	2,871,810	3,724,158	31,882	1,289,169	1,842,963	0	409	0	
Jun	INT	2,682	2,680	0	485,424	495,186	73	5,607,183	6,382,862	8,502	1,385,577	2,452,315	0	969	28,294	
	DOM	3,283	3,277	24	403,597	393,707	3,012	3,344,126	3,507,306	29,899	1,400,446	1,098,714	0	390	0	
Jul	INT	3,010	3,006	0	554,626	566,816	206	6,622,017	7,196,177	5,773	1,407,942	2,659,938	0	835	63,797	
	DOM	3,644	3,645	29	503,684	547,351	3,249	4,058,774	5,192,934	36,746	1,086,028	1,251,169	0	0	0	
Agt	INT	3,090	3,084	0	543,139	620,411	676	6,345,945	7,983,648	8,968	686,982	2,660,287	0	345	69,237	
	DOM	3,624	3,626	38	475,014	506,108	3,047	3,706,817	4,587,834	35,678	1,198,196	1,342,233	0	0	0	
Sep	INT	2,914	2,911	0	497,438	552,726	283	5,907,170	7,242,174	10,837	1,315,772	2,646,694	0	39,517	79,235	
	DOM	3,630	3,622	50	440,381	456,286	3,329	3,252,405	3,911,819	32,913	1,490,583	1,342,242	0	0	0	
Okt	INT	2,986	2,976	0	427,548	493,793	308	4,862,157	6,114,048	5,928	1,041,632	2,591,049	0	3,812	198,635	
	DOM	3,562	3,577	44	393,517	413,857	4,865	2,867,659	3,380,583	45,290	1,471,768	1,209,617	0	0	179	
Nop	INT	2,522	2,536	0	334,350	385,922	350	3,738,081	4,893,856	253	886,728	2,265,040	0	15,281	260,477	
	DOM	3,123	3,109	38	364,273	367,732	6,996	2,518,064	2,967,055	39,726	1,218,603	1,098,755	0	315	230	
Des	INT	2,426	2,412	0	323,325	276,092	5	3,935,973	3,520,819	0	409,421	1,114,879	0	439	174,641	
	DOM	3,602	3,616	34	426,955	395,037	4,713	3,200,648	3,388,203	47,087	1,108,836	854,387	0	36	529	
JUMLAH	INT	32,053	31,982	0	5,317,800	5,628,157	2,436	61,361,583	71,675,585	66,084	12,818,332	28,880,457	0	66,786	1,066,666	
	DOM	40,938	41,003	437	4,928,000	5,128,509	46,192	36,595,719	44,355,874	438,282	14,539,306	14,939,195	0	3,766	7,242	
JML	INT	64,035			10,948,393			133,103,252			41,698,789			1,133,452		
SELURUH	DOM	82,378			10,102,701			81,389,875			29,478,501			11,008		
TOTAL	INT+DOM	146,413			21,051,094			214,493,127			71,177,290			1,144,460		



## Lampiran 9. Statistik Lalu Lintas Angkutan Udara Tahun 2018

<b>Statistik Lalu Lintas Angkutan Udara</b>															
<b>Tahun 2018</b>															
<b>BULAN</b>	<b>INT</b>	<b>AIRCRAFT</b>			<b>PASSENGER</b>			<b>BAGGAGE (KG)</b>			<b>CARGO (KG)</b>			<b>P O S (KG)</b>	
	<b>DOM</b>	<b>ARR</b>	<b>DEP</b>	<b>LCL</b>	<b>ARR</b>	<b>DEP</b>	<b>TRS</b>	<b>ARR</b>	<b>DEP</b>	<b>TRS</b>	<b>ARR</b>	<b>DEP</b>	<b>TRS</b>	<b>ARR</b>	<b>DEP</b>
Jan	INT	2,680	2,689	1	371,122	399,894	0	4,337,224	5,178,104	0	404,986	1,012,241	0	12,382	395,738
	DOM	3,669	3,660	50	394,330	449,722	3,368	2,828,858	4,006,989	39,492	1,103,906	1,013,477	0	11,038	121
Peb	INT	2,774	2,774	0	444,214	459,394	0	4,645,678	5,287,675	7,501	489,972	1,168,886	88	249	304,415
	DOM	3,268	3,261	30	405,378	401,929	2,882	2,778,303	3,187,358	65,395	1,053,921	863,803	3,363	531	3,175
Mar	INT	2,947	2,941	0	480,284	488,759	0	5,335,604	5,962,312	0	597,037	1,457,905	0	10,672	283,018
	DOM	3,487	3,481	52	437,430	426,825	3,385	2,934,749	3,406,881	35,014	768,454	930,519	0	1,902	24
Apr	INT	2,994	3,000	0	506,752	536,782	84	5,621,380	6,558,193	0	786,649	1,453,484	0	13,450	302,526
	DOM	3,660	3,651	66	454,709	468,396	5,965	3,021,554	3,731,207	36,345	713,689	1,134,116	0	0	66
Mei	INT	3,054	3,049	0	513,042	558,419	827	5,720,635	6,906,051	1,116	871,328	1,192,848	0	4,504	308,481
	DOM	3,576	3,594	134	420,162	433,841	3,867	2,886,130	3,526,224	38,510	686,333	1,148,576	0	17	0
Jun	INT	3,069	3,066	0	548,854	558,777	0	6,356,014	6,869,846	0	788,882	1,049,743	0	16,280	289,903
	DOM	3,675	3,672	31	481,479	478,647	2,867	3,937,299	4,487,054	36,068	501,408	607,443	0	0	0
Jul	INT	3,354	3,355	0	605,755	618,800	0	7,153,284	7,714,245	0	626,802	1,012,971	0	2,389	262,310
	DOM	3,969	3,970	24	538,578	546,419	3,781	4,262,203	4,973,536	40,726	728,542	779,527	0	1,209	1,528
Agt	INT	3,365	3,374	0	548,916	632,944	8	6,483,529	8,116,436	0	621,837	1,142,810	0	10,075	186,532
	DOM	3,915	3,927	31	489,990	510,012	3,298	3,774,890	4,619,725	36,217	847,349	785,186	0	5,259	56,263
Sep	INT	3,156	3,151	0	567,512	580,018	10	6,627,961	7,546,201	0	896,650	1,281,633	0	3,946	176,873
	DOM	3,702	3,695	22	468,536	464,117	3,078	3,361,849	3,907,551	35,781	903,728	766,273	0	0	56

Okt	INT	3,311	3,317	0	542,098	600,006	6,585	6,139,835	7,542,088	0	2,115,697	2,739,881	38,804	96	236,929
	DOM	3,918	3,927	125	476,692	481,960	24,060	3,289,224	3,909,987	42,646	1,642,693	1,609,560	0	0	3
Nop	INT	2,905	2,921	0	450,592	480,404	6,064	4,965,017	5,986,301	0	4,743,543	6152576	22,411	28	94,887
	DOM	3,639	3,647	32	445,064	440,757	28923	2,933,519	3,501,524	50,426	3,082,355	3076558	0	21	0
Des	INT	3,082	3,089	0	532,873	494,937	22,648	6,117,917	5,908,602	3,312	4,546,969	5,378,648	2,814	342	301,450
	DOM	3,802	3,813	31	518,777	475,891	26,689	3,847,333	4,084,317	44,621	2,941,582	3,089,046	0	0	16
JUMLAH	INT	36,691	36,726	1	6,112,014	6,409,134	36,226	69,504,078	79,576,054	11,929	17,490,352	25,043,626	64,117	74,413	3,143,062
	DOM	44,280	44,298	628	5,531,125	5,578,516	112,163	39,855,911	47,342,353	501,241	14,973,960	15,804,084	3,363	67,311	61,252
JML	INT	73,417			12,557,374			149,092,061			42,598,095			3,217,475	
SELURUH	DOM	89,206			11,221,804			87,699,505			30,781,407			128,563	
TOTAL	INT+DOM	<b>162,623</b>			<b>23,779,178</b>			<b>236,791,566</b>			<b>73,379,502</b>			<b>3,346,038</b>	

Lampiran 10. Statistik Lalu Lintas Angkutan Udara Tahun 2019

## Statistik Lalu Lintas Angkutan Udara

Tahun 2019

BULAN	INT	AIRCRAFT			PASSENGER			BAGGAGE (KG)			CARGO (KG)			P O S (KG)	
	DOM	ARR	DEP	LCL	ARR	DEP	TRS	ARR	DEP	TRS	ARR	DEP	TRS	ARR	DEP
Jan	INT	3,066	3,073		506,304	541,882	7	5,697,113	6,871,065	35	3,617,174	4,129,844	0	151	0
	DOM	3,347	3,354	8	377,073	429,131	2,831	2,524,109	3,706,553	33,221	2,616,577	2,208,855	0	0	34
Peb	INT	2,783	2,790		484,603	500,308	11,572	5,125,243	5,762,806	13,012	2,644,184	3,413,749	3,222	491	382
	DOM	2,953	2,962	16	363,736	356,913	29,264	2,218,147	2,469,706	33,027	2,440,157	1,610,651	0	150	327
Mar	INT	2,887	2,908		504,333	514,038	6,727	5,527,163	6,229,325	4,706	3,569,495	4,940,545	8,651	310	162
	DOM	3,169	3,189	14	369,107	369,952	29,718	2,088,562	2,492,216	39,986	2,575,409	2,036,531	0	168	154

Apr	INT	3,041	2,965	0	577,663	538,583	4,967	6,555,987	6,597,623	2,710	3,905,247	3,955,577	0	2,422	18,248	
	DOM	3,346	3,304	11	371,883	364,295	27,255	2,187,126	2,504,648	38,686	2,385,199	2,397,023	0	42	12	
Mei	INT	3,066	3,072	0	547,067	573,713	3,323	6,061,791	7,092,116	10,207	3,494,102	3,867,152	146	536	10,410	
	DOM	2,918	2,935	3	295,277	289,413	27,603	1,909,390	1,977,125	38,498	2,659,459	2,145,470	0	670	85	
Jun	INT	3,043	3,027	0	603,388	581,402	5,720	6,977,610	7,169,845	1,390	3,185,739	2,699,205	0	872	31,089	
	DOM	3,530	3,548	20	457,760	459,970	38,380	3,060,212	3,732,545	25,985	1,777,501	1,808,425	0	117	257	
Jul	INT	3,182	3,185	0	643,306	633,381	7,817	7,600,668	7,844,631	12,034	3,566,405	3,224,058	0	388	35,707	
	DOM	3,492	3,495	22	454,068	459,472	35,495	3,033,029	3,550,561	32,163	2,111,348	2,250,699	0	0	0	
Agt	INT	3,272	3,281	0	648,459	673,880	3,786	7,611,678	8,631,547	218	3,255,802	2,863,142	0	6,400	87,419	
	DOM	3,632	3,635	25	483,823	480,321	30,788	3,148,876	3,665,326	31,330	2,054,966	2,025,725	0	0	1,227	
Sep	INT	3,103	3,114	0	618,727	625,615	5,406	7,325,523	8,088,188	1,301	3,651,468	3,199,492	0	6,559	66,397	
	DOM	3,413	3,415	17	418,285	425,147	31,753	2,586,867	3,018,092	39,513	1,989,948	2,205,909	0	0	0	
Okt	INT	3,162	3,187	0	598,771	634,630	7,027	6,915,923	8,030,704	115	4,034,554	3,498,067	0	38,829	102,758	
	DOM	3,567	3,566	15	440,904	435,945	34,961	2,588,636	2,975,988	40,523	1,978,686	2,266,686	0	4,282	0	
Nop	INT	3,082	3,103	0	531,908	563,084	8,682	6,011,195	6,882,948	0	4,460,047	4,028,148	0	58,793	142,943	
	DOM	3,529	3,533	10	433,919	435,111	33,978	2,424,547	2,913,225	43,838	1,914,794	1,882,517	0	3,829	0	
Des	INT	3,248	3,246	0	600,405	558,692	17,264	6,978,404	6,670,890	0	4,331,141	4,224,612	0	28,174	115,698	
	DOM	3,718	3,717	20	508,723	450,422	30,445	3,272,457	3,231,150	39,629	2,161,893	1,947,702	0	3,050	0	
JUMLAH	INT	36,935	36,951	0	6,864,934	6,939,208	82,298	78,388,298	85,871,688	45,728	43,715,358	44,043,591	12,019	143,925	611,213	
	DOM	40,614	40,653	181	4,974,558	4,956,092	352,471	31,041,958	36,237,135	436,399	26,665,937	24,786,193	0	12,308	2,096	
JML	INT	73,886			13,886,440			164,305,714			87,770,968			755,138		
SELURUH	DOM	81,448			10,283,121			67,715,492			51,452,130			14,404		
TOTAL	INT+DOM	155,334			24,169,561			232,021,206			139,223,098			769,542		

## Lampiran 11. Statistik Lalu Lintas Angkutan Udara Tahun 2020

<b>Statistik Lalu Lintas Angkutan Udara</b>															
<b>Tahun 2020</b>															
<b>BULAN</b>	<b>INT</b>	<b>AIRCRAFT</b>			<b>PASSENGER</b>			<b>BAGGAGE (KG)</b>			<b>CARGO (KG)</b>			<b>P O S (KG)</b>	
	<b>DOM</b>	<b>ARR</b>	<b>DEP</b>	<b>LCL</b>	<b>ARR</b>	<b>DEP</b>	<b>TRS</b>	<b>ARR</b>	<b>DEP</b>	<b>TRS</b>	<b>ARR</b>	<b>DEP</b>	<b>TRS</b>	<b>ARR</b>	<b>DEP</b>
Jan	INT	3,352	3,376	0	589,616	640,825	18,847	6,735,538	7,911,141	0	3,942,870	3,868,063	0	76,077	112,283
	DOM	3,558	3,537	16	390,101	453,343	29,900	2,298,810	3,440,040	33,751	1,894,533	1,467,774	430	11,566	42
Peb	INT	2,627	2,627	0	393,607	425,699	14,549	4,611,901	5,338,031	298	2,411,061	3,326,791	0	26,946	105,293
	DOM	3,124	3,129	20	346,594	346,962	31,342	1,931,841	2,222,578	31,316	1,474,419	1,018,531	0	1,471	0
Mar	INT	1,772	1,775	0	188,478	275,429	8,405	2,335,751	3,693,166	273	2,796,924	3,656,184	0	76,721	167,269
	DOM	2,829	2,830	25	229,054	253,517	31,038	1,305,267	1,693,775	16,140	1,521,647	1,251,044	0	6,360	9,443
Apr	INT	120	121	0	5,773	7,018	0	109,463	123,270	2,838	405,150	509,482	0	31,097	42,730
	DOM	822	825	5	29,257	44,122	8,310	193,264	291,197	403	700,540	959,557	0	0	12,832
Mei	INT	76	73	0	2,106	1,624	0	48,768	27,830	0	121,152	530,443	0	0	22,696
	DOM	81	85	7	2,673	2,423	3	32,818	28,487	0	203,933	348,247	0	0	0
Jun	INT	38	37	0	495	877	0	12,215	14,952	0	293,177	515,053	268	0	0
	DOM	233	237	0	6,446	11,396	602	70,387	136,317	0	479,434	649,351	0	0	0
Jul	INT	51	48	0	1,103	2,117	121	23,278	49,290	0	137,172	334,408	0	19,409	1
	DOM	635	645	2	35,802	41,375	68	230,870	352,623	0	629,747	715,573	0	903	93
Agt	INT	98	102	0	735	1,461	149	8,632	17,540	3,089	400,800	482,005	1,828	67,517	67,143
	DOM	1,088	1,085	12	86,225	83,260	2,632	502,742	583,320	13,046	754,027	935,741	19,575	1,516	298
Sep	INT	70	70	0	141	391	0	1,573	6,802	0	91,886	403,629	631	61,028	5,100
	DOM	1,217	1,214	9	88,588	80,930	7,570	510,667	550,438	29,461	809,091	1,022,526	100,882	6,919	7,336

Okt	INT	73	68	0	338	93	192	3,352	29	3,327	114,330	457,806	20,818	26,835	15,513
	DOM	1,459	1,446	12	121,696	99,469	9,798	749,123	728,886	31,010	969,732	1,211,859	114,900	7,245	9,778
Nop	INT	74	80	0	245	273	156	4,108	0	4,093	168,851	508,922	582	1,126	0
	DOM	1,860	1,877	7	170,247	169,655	11,009	973,100	1,241,933	35,729	1,038,634	1,373,814	110,556	13,000	13,497
Des	INT	96	90	0	417	196	0	7	33	0	205,404	392,289	308	10,096	0
	DOM	2,662	2,663	3	228,945	189,289	13,657	1,704,032	1,704,999	42,048	1,134,166	1,485,053	116,426	27,244	16,490
JUMLAH	INT	8,447	8,467	0	1,183,054	1,356,003	42,419	13,894,586	17,182,084	13,918	11,088,777	14,985,075	24,435	396,852	538,028
	DOM	19,568	19,573	118	1,735,628	1,775,741	145,929	10,502,921	12,974,593	232,904	11,609,903	12,439,070	462,769	76,224	69,809
JML	INT	16,914			2,581,476			31,090,588			26,098,287			934,880	
SELURUH	DOM	39,259			3,657,298			23,710,418			24,511,742			146,033	
TOTAL	INT+DOM	56,173			6,238,774			54,801,006			50,610,029			1,080,913	

Lampiran 12. Statistik Lalu Lintas Angkutan Udara Tahun 2021

<b>Statistik Lalu Lintas Angkutan Udara</b>															
<b>Tahun 2021</b>															
BULAN	INT	AIRCRAFT			PASSENGER			BAGGAGE (KG)			CARGO (KG)			P O S (KG)	
	DOM	ARR	DEP	LCL	ARR	DEP	TRS	ARR	DEP	TRS	ARR	DEP	TRS	ARR	DEP
Jan	INT	53	57	0	66	198	0	10	18	0	202,600	416,625	0	5,694	0
	DOM	1,727	1,735	3	83,409	118,962	9,762	706,094	1,178,902	29,527	980,817	1,418,013	132,151	17,088	16,812
Peb	INT	49	45	0	98	73	5	60	45	0	102,145	336,140	0	0	0
	DOM	1,123	1,123	0	77,269	70,644	8,359	510,135	548,705	24,060	916,581	1,279,690	142,143	17,584	11,471
Mar	INT	61	60	0	199	200	0	138	505	0	130,398	574,746	0	4,145	0
	DOM	1,416	1,425	4	134,558	116,888	12,624	848,597	945,621	20,379	923,884	1,603,702	28,447	19,062	17,208



Apr	INT	50	47	3	71	79	0	430	388	0	173,983	471,972	0	3,046	0	
	DOM	1,513	1,516	28	151,024	142,250	13,683	942,113	1,144,320	31,754	956,360	1,625,249	2,307	20,108	22,867	
Mei	INT	67	65	0	296	197	21	317	1,179	0	96,133	268,935	0	243	0	
	DOM	1,168	1,167	8	139,044	120,879	8,617	957,260	1,048,073	7,701	747,500	1,416,475	5,158	13,986	14,647	
Jun	INT	73	74	0	346	577	1	708	7,097	0	60,160	224,997	18,191	0	0	
	DOM	1,760	1,762	5	229,946	225,710	7,321	1,503,185	1,912,718	16,288	977,042	1,545,876	1,988	23,647	22,913	
Jul	INT	48	52	0	176	159	0	793	1,443	0	2,980	124,141	69,519	0	0	
	DOM	582	580	2	32,135	49,999	624	319,622	591,004	1,220	790,069	1,271,177	918	6,194	7,356	
Agt	INT	44	47	0	177	419	0	1,610	7,170	0	1,636	75,097	14,289	0	0	
	DOM	536	533	0	42,446	47,409	108	356,499	518,278	0	754,276	1,090,051	1,082	6,422	7,813	
Sep	INT	55	58	2	267	417	0	634	7,064	0	4,684	176,795	40,708	0	0	
	DOM	1,022	1,018	0	120,066	113,912	961	919,650	1,079,222	4,521	821,795	1,291,973	15	14,314	12,615	
Okt	INT	51	52	0	209	240	3	369	1,481	0	0	105,898	18,871	0	0	
	DOM	1,799	1,796	2	236,847	224,887	2,656	1,837,227	2,245,093	380	785,345	1,510,802	844	32,964	30,783	
Nop	INT	38	41	0	151	142	0	126	444	2	0	79,063	0	0	0	
	DOM	2,184	2,180	5	279,160	274,179	2,289	2,176,610	2,737,103	1,056	815,910	1,562,954	273	51,030	43,402	
Des	INT	83	81	0	538	320	2	3,270	4,294	0	0	78,805	4	0	0	
	DOM	2,609	2,604	7	353,906	318,264	147	2,895,435	3,176,494	1,330	868,820	1,635,871	34,695	73,167	57,617	
JUMLAH	INT	672	679	5	2,594	3,021	32	8,465	31,128	2	774,719	2,933,214	161,582	13,128	0	
	DOM	17,439	17,439	64	1,879,810	1,823,983	67,151	13,972,427	17,125,533	138,216	10,338,399	17,251,833	350,021	295,566	265,504	
JML	INT	1,351			5,647			39,595			3,869,515			13,128		
SELURUH	DOM	34,942			3,770,944			31,236,176			27,940,253			561,070		
TOTAL	INT+DOM	36,293			3,776,591			31,275,771			31,809,768			574,198		

Lampiran 13. Data Jumlah Kedatangan Penumpang Domestik di Bandara Internasional I Gusti Ngurah Rai Januari 2010 hingga Desember 2021

Bulan	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Januari	191,726	241,418	282,209	316,758	364,588	311,636	359,951	387,804	394,330	377,073	390,101	83,409
Februari	181,643	228,452	253,433	295,008	311,109	300,620	348,410	332,745	405,378	363,736	346,594	77,269
Maret	193,742	232,021	274,715	335,016	315,131	309,211	390,195	375,962	437,430	369,107	229,054	134,558
April	199,078	244,608	284,237	317,813	338,781	339,866	386,318	415,931	454,709	371,883	29,257	151,024
Mei	213,242	262,609	304,036	354,944	383,221	380,972	451,226	408,137	420,162	295,277	2,673	139,044
Juni	230,831	298,381	337,398	411,924	391,900	358,808	383,007	403,597	481,479	457,760	6,446	229,946
Juli	258,998	312,529	336,374	337,289	366,400	379,299	500,963	503,684	538,578	454,068	35,802	32,135
Agustus	200,706	255,878	329,946	406,771	431,532	384,913	450,042	475,014	489,990	483,823	86,225	42,446
September	238,337	283,522	332,820	379,133	375,687	346,839	412,801	440,381	468,536	418,285	88,588	120,066
Oktober	248,312	285,235	347,368	356,315	396,793	401,273	416,044	393,517	476,692	440,904	121,696	236,847
November	228,264	291,316	347,973	374,706	379,872	326,278	403,606	364,273	445,064	433,919	170,247	279,160
Desember	283,366	317,942	388,859	434,314	434,034	435,918	475,110	426,955	518,777	508,723	228,945	353,906

Lampiran 14. Data Jumlah Keberangkatan Penumpang Domestik di Bandara Internasional I Gusti Ngurah Rai Januari 2010 hingga Desember 2021

Bulan	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Januari	207,112	266,312	309,316	333,940	399,598	355,290	377,400	448,684	449,722	429,131	453,343	118,962
Februari	177,614	222,564	245,835	287,521	321,473	292,713	337,308	357,390	401,929	356,913	346,962	70,644
Maret	190,026	229,500	265,782	323,799	332,069	315,747	388,281	378,507	426,825	369,952	253,517	116,888
April	203,897	242,178	288,687	316,103	330,060	334,020	349,122	421,255	468,396	364,295	44,122	142,250
Mei	217,324	261,806	300,476	347,563	381,124	375,617	427,732	442,595	433,841	289,413	2,423	120,879
Juni	228,384	280,570	316,086	391,421	407,395	356,184	381,772	393,707	478,647	459,970	11,396	225,710
Juli	265,817	322,004	344,392	340,779	348,361	380,555	511,350	547,351	546,419	459,472	41,375	49,999
Agustus	217,881	241,207	334,517	393,681	457,898	404,744	475,352	506,108	510,012	480,321	83,260	47,409
September	240,724	299,221	322,599	374,538	377,827	327,998	430,794	456,286	464,117	425,147	80,930	113,912
Oktober	249,723	287,050	342,240	352,947	389,124	355,265	430,997	413,857	481,960	435,945	99,469	224,887
November	229,352	288,037	339,127	375,921	380,711	316,929	412,134	367,732	440,757	435,111	169,655	274,179
Desember	259,970	300,026	350,840	405,509	390,913	377,617	455,970	395,037	475,891	450,422	189,289	318,264

Lampiran 15. *Output* Data Jumlah Kedatangan Penumpang Domestik yang di *Import* kedalam Program R

```
> arrival <- ts(arrival,start=c(2010,1),freq=12)
> arrival
```

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	191726	181643	193742	199078	213242	230831	258998	200706	238337	248312	228264	283366
2011	241418	228452	232021	244608	262609	298381	312529	255878	283522	285235	291316	317942
2012	282209	253433	274715	284237	304036	337398	336374	329946	332820	347368	347973	388859
2013	316758	295008	335016	317813	354944	411924	337289	406771	379133	356315	374706	434314
2014	364588	311109	315131	338781	383221	391900	366400	431532	375687	396793	379872	434034
2015	311636	300620	309211	339866	380972	358808	379299	384913	346839	401273	326278	435918
2016	359951	348410	390195	386318	451226	383007	500963	450042	412801	416044	403606	475110
2017	387804	332745	375962	415931	408137	403597	503684	475014	440381	393517	364273	426955
2018	394330	405378	437430	454709	420162	481479	538578	489990	468536	476692	445064	518777
2019	377073	363736	369107	371883	295277	457760	454068	483823	418285	440904	433919	508723
2020	390101	346594	229054	29257	2673	6446	35802	86225	88588	121696	170247	228945
2021	83409	77269	134558	151024	139044	229946	32135	42446	120066	236847	279160	353906

Lampiran 16. *Output* Nilai ACF dan PACF Data Jumlah Kedatangan Penumpang Domestik

```
> ACF.arr<-Acf(arrival)
> ACF.arr
```

Autocorrelations of series 'arrival', by lag

0	1	2	3	4	5	6	7	8	9	10	11	12
1.000	0.879	0.799	0.712	0.638	0.573	0.530	0.478	0.435	0.409	0.390	0.393	0.422
0.346	0.314	0.267	0.201	0.119	0.042	-0.017	-0.054	-0.077	-0.083	-0.055	-0.032	

```
> PACF.arr<-Pacf(arrival)
> PACF.arr
```

Partial autocorrelations of series 'arrival', by lag

1	2	3	4	5	6	7	8	9	10	11	12	13
0.879	0.116	-0.052	0.005	0.011	0.068	-0.036	0.002	0.062	0.045	0.105	0.156	-0.410
0.071	-0.002	-0.173	-0.151	-0.123	0.089	0.083	-0.037	0.079	0.128	-0.046		

Lampiran 17. *Output* Nilai ADF Data Jumlah Kedatangan Penumpang Domestik

```
> adf.test(arrival)
```

Augmented Dickey-Fuller Test

data: arrival  
Dickey-Fuller = -2.2744, Lag order = 5, p-value = 0.4622  
alternative hypothesis: stationary

Lampiran 18. *Output* Hasil *Differencing* Pertama Data Jumlah Kedatangan Penumpang

```
> arrival_diffnonmusiman <- diff(arrival, differences = 1)
> arrival_diffnonmusiman
```

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010		-10083	12099	5336	14164	17589	28167	-58292	37631	9975	-20048	55102
2011	-41948	-12966	3569	12587	18001	35772	14148	-56651	27644	1713	6081	26626
2012	-35733	-28776	21282	9522	19799	33362	-1024	-6428	2874	14548	605	40886
2013	-72101	-21750	40008	-17203	37131	56980	-74635	69482	-27638	-22818	18391	59608
2014	-69726	-53479	4022	23650	44440	8679	-25500	65132	-55845	21106	-16921	54162
2015	-122398	-11016	8591	30655	41106	-22164	20491	5614	-38074	54434	-74995	109640
2016	-75967	-11541	41785	-3877	64908	-68219	117956	-50921	-37241	3243	-12438	71504
2017	-87306	-55059	43217	39969	-7794	-4540	100087	-28670	-34633	-46864	-29244	62682
2018	-32625	11048	32052	17279	-34547	61317	57099	-48588	-21454	8156	-31628	73713
2019	-141704	-13337	5371	2776	-76606	162483	-3692	29755	-65538	22619	-6985	74804
2020	-118622	-43507	-117540	-199797	-26584	3773	29356	50423	2363	33108	48551	58698
2021	-145536	-6140	57289	16466	-11980	90902	-197811	10311	77620	116781	42313	74746

## Lampiran 19. Output Hasil Test ADF Setelah Differencing

```
> adf.test(arrival_diffnonmusiman)

Augmented Dickey-Fuller Test

data: arrival_diffnonmusiman
Dickey-Fuller = -5.2208, Lag order = 5, p-value = 0.01
alternative hypothesis: stationary
```

## Lampiran 20. Output Nilai ACF dan PACF setelah Differencing

```
> ACFdiff<-Acf(arrival_diffnonmusiman)
> ACFdiff

Autocorrelations of series 'arrival_diffnonmusiman', by lag

   0    1    2    3    4    5    6    7    8    9   10   11   12   13
1.000 -0.175 0.040 -0.051 -0.028 -0.088 0.033 -0.052 -0.056 -0.031 -0.096 -0.095 0.429 -0.190
  14   15   16   17   18   19   20   21   22   23   24
0.072 0.088 0.072 -0.005 -0.069 -0.116 -0.049 -0.090 -0.149 0.028 0.283
> PACFdiff<-Pacf(arrival_diffnonmusiman)
> PACFdiff

Partial autocorrelations of series 'arrival_diffnonmusiman', by lag

   1    2    3    4    5    6    7    8    9   10   11   12   13   14
-0.175 0.009 -0.044 -0.046 -0.102 -0.001 -0.050 -0.089 -0.066 -0.132 -0.161 0.392 -0.101 -0.025
  15   16   17   18   19   20   21   22   23   24
0.150 0.119 0.076 -0.135 -0.140 -0.013 -0.128 -0.165 0.014 0.165
```

## Lampiran 21. Output Nilai $\lambda$ pada Uji Box-Cox Data Jumlah Kedatangan Penumpang Domestik

```
> lamda<-boxcox(data_positif~1)
> powerTransform(data_positif)
Estimated transformation parameter
data_positif
1.193998
```

## Lampiran 22. Output Model Tentatif SARIMA Data Jumlah Kedatangan Penumpang $ARIMA(0,1,0)(1,0,0)^{12}$ , $ARIMA(0,1,1)(1,0,0)^{12}$ , dan $ARIMA(1,1,0)(1,0,0)^{12}$

```
> fit.a1<-Arima(arrival, order = c(0,1,0), seasonal=list(order=c(1,0,0), periode=12), method = "CSS")
> coefest(fit.a1)

z test of coefficients:

      Estimate Std. Error z value Pr(>|z|)
sar1 0.549252    0.081381  6.7492 1.487e-11 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

> summary(fit.a1)
Series: arrival
ARIMA(0,1,0)(1,0,0)[12]

Coefficients:
      sar1
      0.5493
s.e.    0.0814

sigma^2 = 2.353e+09: log likelihood = -1751.58

Training set error measures:
      ME      RMSE      MAE      MPE      MAPE      MASE      ACF1
Training set 639.204 48173.32 32766.76 -12.18891 33.85336 0.4708824 -0.08674833
```

```

> fit.a2<-Arima(arrival, order = c(0,1,1), seasonal=list(order=c(1,0,0), periode=12), method = "CSS")
> coeftest(fit.a2)

z test of coefficients:

      Estimate Std. Error z value Pr(>|z|)
ma1  -0.078148  0.080520 -0.9705   0.3318
sar1  0.538724  0.082917  6.4972 8.184e-11 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

> summary(fit.a2)
Series: arrival
ARIMA(0,1,1)(1,0,0)[12]

Coefficients:
      ma1      sar1
-0.0781  0.5387
s.e.    0.0805  0.0829

sigma^2 = 2.354e+09: log likelihood = -1751.1

Training set error measures:
      ME      RMSE      MAE      MPE      MAPE      MASE      ACF1
Training set 669.8362 48012.06 32609.09 -16.84083 30.3547 0.4686167 -0.005071736
> fit.a3<-Arima(arrival, order = c(1,1,0), seasonal=list(order=c(1,0,0), periode=12), method = "CSS")
> coeftest(fit.a3)

z test of coefficients:

      Estimate Std. Error z value Pr(>|z|)
ar1  -0.088617  0.084256 -1.0518   0.2929
sar1  0.537824  0.082901  6.4876 8.724e-11 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

> summary(fit.a3)
Series: arrival
ARIMA(1,1,0)(1,0,0)[12]

Coefficients:
      ar1      sar1
-0.0886  0.5378
s.e.    0.0843  0.0829

sigma^2 = 2.351e+09: log likelihood = -1751.56

Training set error measures:
      ME      RMSE      MAE      MPE      MAPE      MASE      ACF1
Training set 724.8759 47984.02 32546.93 -17.0678 30.57274 0.4677234 0.006920543

```

### Lampiran 23. Output Hasil Uji Ljung-Box dan Uji Kolmogorov-Smirnov pada Sisaan Model Tentatif $ARIMA(0,1,0)(1,0,0)$ <sup>12</sup>

```

> Box.test(fit.a1$residuals,type = "Ljung-Box")

Box-Ljung test

data: fit.a1$residuals
X-squared = 1.1064, df = 1, p-value = 0.2929

> ks.test(fit.a1$residuals,"pnorm")

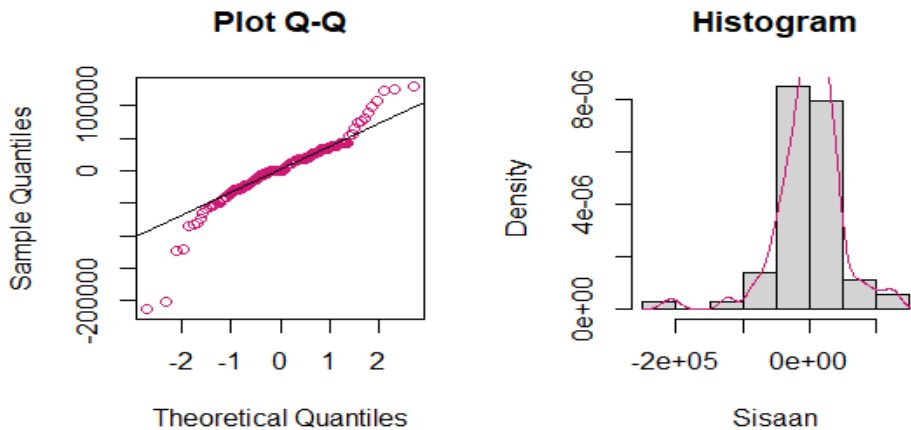
Asymptotic one-sample Kolmogorov-Smirnov test

data: fit.a1$residuals
D = 0.47917, p-value < 2.2e-16
alternative hypothesis: two-sided

```



Lampiran 24. Plot Sebaran normal sisaan model  $ARIMA(0,1,0)(1,0,0)^{12}$



Lampiran 25. Output Model *Overfitting* SARIMA Data Jumlah Kedatangan Penumpang  $ARIMA(0,1,0)(2,0,0)^{12}$ , dan  $ARIMA(0,1,0)(1,0,1)^{12}$

```
> overfit.a1<-Arima(arrival, order = c(0,1,0), seasonal=list(order=c(2,0,0), periode=12), method = "CSS")
> coefest(overfit.a1)

z test of coefficients:

      Estimate Std. Error z value Pr(>|z|)
sar1  0.45098   0.10156  4.4403 8.982e-06 ***
sar2  0.17300   0.11372  1.5213  0.1282
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

> summary(overfit.a1)
Series: arrival
ARIMA(0,1,0)(2,0,0)[12]

Coefficients:
      sar1      sar2
      0.4510   0.1730
s.e.  0.1016   0.1137

sigma^2 = 2.318e+09: log likelihood = -1756.85

Training set error measures:
      ME      RMSE      MAE      MPE      MAPE      MASE      ACF1
Training set 156.1256 47637.96 31692.16 -12.23955 32.22871 0.4554397 -0.09281367
> overfit.a2<-Arima(arrival, order = c(0,1,0), seasonal=list(order=c(1,0,1), periode=12), method = "CSS")
> coefest(overfit.a2)

z test of coefficients:

      Estimate Std. Error z value Pr(>|z|)
sar1  0.70519   0.12588  5.6020 2.119e-08 ***
sma1 -0.22531   0.16825 -1.3392  0.1805
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

> summary(overfit.a2)
Series: arrival
ARIMA(0,1,0)(1,0,1)[12]

Coefficients:
      sar1      sma1
      0.7052  -0.2253
s.e.  0.1259   0.1682

sigma^2 = 2.34e+09: log likelihood = -1750.68

Training set error measures:
      ME      RMSE      MAE      MPE      MAPE      MASE      ACF1
Training set 251.4134 47871.62 32456.65 -12.34937 32.55067 0.4664259 -0.09150134
```

Lampiran 26. *Output* Hasil Prediksi Peramalan Data Jumlah Kedatangan Penumpang dengan model  $ARIMA(0,1,0)(1,0,0)^{12}$  12 periode kedepan

```
> forecasting.arr<-forecast(arrival,model=fit.a1,h=12)
> forecasting.arr
```

	Point Forecast	Lo 80	Hi 80	Lo 95	Hi 95
Jan 2022	273970.0	211800.18	336139.9	178889.461	369050.6
Feb 2022	270597.6	182676.19	358519.0	136133.394	405061.8
Mar 2022	302063.7	194382.41	409745.0	137379.364	466748.1
Apr 2022	311107.7	186768.04	435447.4	120946.593	501268.8
May 2022	304527.7	165511.69	443543.7	91921.075	517134.3
Jun 2022	354455.8	202171.42	506740.2	121556.944	587354.7
Jul 2022	245807.7	81321.73	410293.6	-5751.857	497367.2
Aug 2022	251471.0	75628.15	427313.9	-17457.436	520399.4
Sep 2022	294104.0	107594.45	480613.5	8862.281	579345.6
Oct 2022	358246.2	161647.91	554844.5	57575.059	658917.3
Nov 2022	381486.7	175292.68	587680.7	66140.159	696833.2
Dec 2022	422541.1	207178.48	637903.7	93172.390	751909.8

Lampiran 27. *Output* Data Jumlah Keberangkatan Penumpang Domestik yang di *Import* kedalam Program R

```
> departure <- ts(departure,start=c(2010,1),freq=12)
> departure
```

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	207112	177614	190026	203897	217324	228384	265817	217881	240724	249723	229352	259970
2011	266312	222564	229500	242178	261806	280570	322004	241207	299221	287050	288037	300026
2012	309316	245835	265782	288687	300476	316086	344392	334517	322599	342240	339127	350840
2013	333940	287521	323799	316103	347563	391421	340779	393681	374538	352947	375921	405509
2014	399598	321473	332069	330060	381124	407395	348361	457898	377827	389124	380711	390913
2015	355290	292713	315747	334020	375617	356184	380555	404744	327998	355265	316929	377617
2016	377400	337308	388281	349122	427732	381772	511350	475352	430794	430997	412134	455970
2017	448684	357390	378507	421255	442595	393707	547351	506108	456286	413857	367732	395037
2018	449722	401929	426825	468396	433841	478647	546419	510012	464117	481960	440757	475891
2019	429131	356913	369952	364295	289413	459970	459472	480321	425147	435945	435111	450422
2020	453343	346962	253517	44122	2423	11396	41375	83260	80930	99469	169655	189289
2021	118962	70644	116888	142250	120879	225710	49999	47409	113912	224887	274179	318264

Lampiran 28. *Output* Nilai ACF dan PACF Data Jumlah Keberangkatan Penumpang Domestik

```
> ACF.dep<-Acf(departure)
> ACF.dep
```

Autocorrelations of series 'departure', by lag

0	1	2	3	4	5	6	7	8	9	10	11	12
1.000	0.897	0.819	0.734	0.659	0.607	0.559	0.509	0.457	0.436	0.413	0.419	0.427
0.363	0.328	0.275	0.206	0.142	0.061	0.007	-0.041	-0.060	-0.073	-0.041	-0.039	

```
> PACF.dep<-Pacf(departure)
> PACF.dep
```

Partial autocorrelations of series 'departure', by lag

1	2	3	4	5	6	7	8	9	10	11	12	13
0.897	0.072	-0.065	-0.005	0.088	0.008	-0.036	-0.044	0.147	0.010	0.126	0.047	-0.347
0.075	-0.032	-0.193	-0.071	-0.154	0.116	0.021	-0.008	0.080	0.159	-0.122		

Lampiran 29. *Output* Nilai ADF Data Jumlah Keberangkatan Penumpang Domestik

```
> adf.test(departure)
```

Augmented Dickey-Fuller Test

data: departure  
Dickey-Fuller = -2.1384, Lag order = 5, p-value = 0.5188  
alternative hypothesis: stationary

### Lampiran 30. Output Hasil Differencing Pertama Data Jumlah Keberangkatan Penumpang

```
> departure_diffnonmusiman
```

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010		-29498	12412	13871	13427	11060	37433	-47936	22843	8999	-20371	30618
2011	6342	-43748	6936	12678	19628	18764	41434	-80797	58014	-12171	987	11989
2012	9290	-63481	19947	22905	11789	15610	28306	-9875	-11918	19641	-3113	11713
2013	-16900	-46419	36278	-7696	31460	43858	-50642	52902	-19143	-21591	22974	29588
2014	-5911	-78125	10596	-2009	51064	26271	-59034	109537	-80071	11297	-8413	10202
2015	-35623	-62577	23034	18273	41597	-19433	24371	24189	-76746	27267	-38336	60688
2016	-217	-40092	50973	-39159	78610	-45960	129578	-35998	-44558	203	-18863	43836
2017	-7286	-91294	21117	42748	21340	-48888	153644	-41243	-49822	-42429	-46125	27305
2018	54685	-47793	24896	41571	-34555	44806	67772	-36407	-45895	17843	-41203	35134
2019	-46760	-72218	13039	-5657	-74882	170557	-498	20849	-55174	10798	-834	15311
2020	2921	-106381	-93445	-209395	-41699	8973	29979	41885	-2330	18539	70186	19634
2021	-70327	-48318	46244	25362	-21371	104831	-175711	-2590	66503	110975	49292	44085

### Lampiran 31. Output Hasil Test ADF Setelah Differencing

```
> adf.test(departure_diffnonmusiman)
```

Augmented Dickey-Fuller Test

data: departure\_diffnonmusiman  
Dickey-Fuller = -5.1724, Lag order = 5, p-value = 0.01  
alternative hypothesis: stationary

### Lampiran 32. Output Nilai ACF dan PACF setelah Differencing

```
> ACFdiff<-Acf(departure_diffnonmusiman)
> ACFdiff
```

Autocorrelations of series 'departure\_diffnonmusiman', by lag

0	1	2	3	4	5	6	7	8	9	10	11	12
1.000	-0.134	0.038	-0.046	-0.117	-0.013	0.019	0.001	-0.156	0.018	-0.156	0.005	0.363
	13	14	15	16	17	18	19	20	21	22	23	24
-0.160	0.090	0.091	-0.024	0.092	-0.120	-0.061	-0.121	-0.035	-0.223	0.157	0.150	

```
> PACFdiff<-Pacf(departure_diffnonmusiman)
> PACFdiff
```

Partial autocorrelations of series 'departure\_diffnonmusiman', by lag

1	2	3	4	5	6	7	8	9	10	11	12	13
-0.134	0.020	-0.039	-0.131	-0.045	0.016	-0.005	-0.183	-0.036	-0.157	-0.066	0.343	-0.114
	14	15	16	17	18	19	20	21	22	23	24	
-0.005	0.176	0.045	0.100	-0.169	-0.084	-0.020	-0.118	-0.192	0.092	0.097		

### Lampiran 33. Output Nilai lambda pada Uji Box-Cox Data Jumlah Keberangkatan Penumpang Domestik

```
> lamda<-boxcox(data_positif~1)
> powerTransform(data_positif)
```

Estimated transformation parameter  
data\_positif  
1.193998

Lampiran 34. *Output* Model Tentatif SARIMA Data Jumlah Keberangkatan Penumpang  $ARIMA(0,1,0)(0,0,1)^{12}$ ,  $ARIMA(1,1,0)(0,0,1)^{12}$ , dan  $ARIMA(0,1,1)(0,0,1)^{12}$

```

> fit.d1<-Arima(departure, order = c(0,1,0), seasonal=list(order=c(0,0,1), periode=12), method = "css")
> coeftest(fit.d1)

z test of coefficients:

      Estimate Std. Error z value Pr(>|z|)
sma1 0.403789   0.084247  4.7929 1.644e-06 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

> summary(fit.d1)
Series: departure
ARIMA(0,1,0)(0,0,1)[12]

Coefficients:
      sma1
      0.4038
s.e.    0.0842

sigma^2 = 2.391e+09:  log likelihood = -1746.45

Training set error measures:
      ME      RMSE      MAE      MPE      MAPE      MASE      ACF1
Training set 994.2591 48556.76 35157.65 -11.4823 25.62994 0.4938695 -0.1103375
> fit.d2<-Arima(departure, order = c(1,1,0), seasonal=list(order=c(0,0,1), periode=12), method = "css")
> coeftest(fit.d2)

z test of coefficients:

      Estimate Std. Error z value Pr(>|z|)
ar1  -0.110622   0.083330 -1.3275  0.1843
sma1  0.398684   0.085786  4.6474  3.361e-06 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

> summary(fit.d2)
Series: departure
ARIMA(1,1,0)(0,0,1)[12]

Coefficients:
      ar1      sma1
      -0.1106  0.3987
s.e.    0.0833  0.0858

sigma^2 = 2.376e+09:  log likelihood = -1745.99

Training set error measures:
      ME      RMSE      MAE      MPE      MAPE      MASE      ACF1
Training set 1218.105 48231.11 34723.51 -18.23373 32.34576 0.487771 0.005659778
> fit.d3<-Arima(departure, order = c(0,1,1), seasonal=list(order=c(0,0,1), periode=12), method = "css")
> coeftest(fit.d3)

z test of coefficients:

      Estimate Std. Error z value Pr(>|z|)
ma1  -0.103723   0.082206 -1.2617  0.207
sma1  0.398647   0.085434  4.6661  3.069e-06 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

> summary(fit.d3)
Series: departure
ARIMA(0,1,1)(0,0,1)[12]

Coefficients:
      ma1      sma1
      -0.1037  0.3986
s.e.    0.0822  0.0854

sigma^2 = 2.381e+09:  log likelihood = -1745.64

Training set error measures:
      ME      RMSE      MAE      MPE      MAPE      MASE      ACF1
Training set 1072.53 48283.05 34873.48 -18.3517 32.42973 0.4898777 -0.003697922

```

Lampiran 35. *Output* Hasil Uji *Ljung-Box* dan Uji *Kolmogorov-Smirnov* pada Sisaan Model Tentatif  $ARIMA(0,1,0)(0,0,1)^{12}$

```
> Box.test(fit.d1$residuals,type = "Ljung-Box")

Box-Ljung test

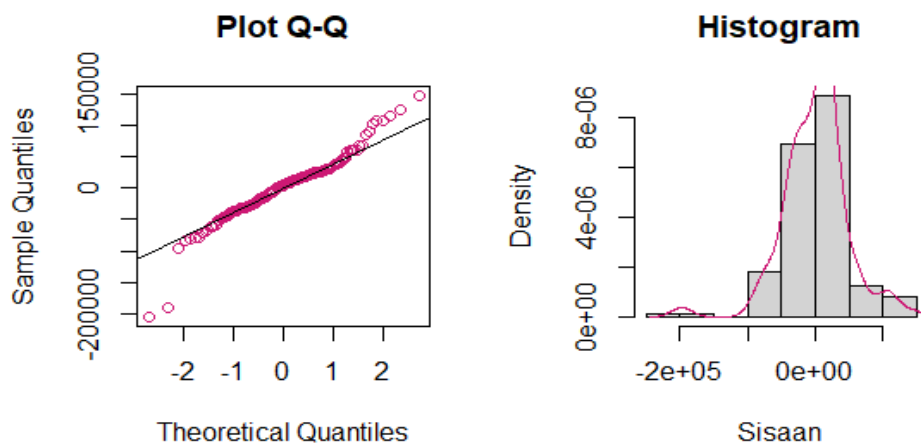
data: fit.d1$residuals
X-squared = 1.7899, df = 1, p-value = 0.1809

> ks.test(fit.d1$residuals,"pnorm")

Asymptotic one-sample kolmogorov-smirnov test

data: fit.d1$residuals
D = 0.54861, p-value < 2.2e-16
alternative hypothesis: two-sided
```

Lampiran 36. Plot Sebaran normal sisaan model  $ARIMA(0,1,0)(0,0,1)^{12}$



Lampiran 37. *Output* Model *Overfitting* SARIMA Data Jumlah Keberangkatan Penumpang  $ARIMA(0,1,0)(0,0,2)^{12}$ , dan  $ARIMA(0,1,0)(1,0,1)^{12}$

```
> overfit.d1<-Arima(departure, order = c(0,1,0), seasonal=list(order=c(0,0,2), periode=12), method = "CSS")
> coeftest(overfit.d1)

z test of coefficients:

      Estimate Std. Error z value Pr(>|z|)
sma1  0.40681    0.10005  4.0660 4.783e-05 ***
sma2  0.33598    0.13799  2.4349  0.0149 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

> summary(overfit.d1)
Series: departure
ARIMA(0,1,0)(0,0,2)[12]

Coefficients:
      sma1  sma2
      0.4068  0.336
s.e.  0.1001  0.138

sigma^2 = 2.305e+09; log likelihood = -1743.33

Training set error measures:
      ME      RMSE      MAE      MPE      MAPE      MASE      ACF1
Training set 815.7918 47509.87 33812.5 -8.923499 22.9428 0.4749738 -0.1002436
```



```

> overfit.d2<-Arima(departure, order = c(0,1,0), seasonal=list(order=c(1,0,1), periode=12), method = "CSS")
> coeftest(overfit.d2)

z test of coefficients:

      Estimate Std. Error z value Pr(>|z|)
sar1  0.483485   0.153741   3.1448 0.001662 **
sma1 -0.050498   0.178506  -0.2829 0.777259
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

> summary(overfit.d2)
Series: departure
ARIMA(0,1,0)(1,0,1)[12]

Coefficients:
      sar1      sma1
      0.4835  -0.0505
s.e.  0.1537   0.1785

sigma^2 = 2.292e+09: log likelihood = -1749.2

Training set error measures:
      ME      RMSE      MAE      MPE      MAPE      MASE      ACF1
Training set 353.4216 47377.25 32262.04 -10.14605 23.01504 0.453194 -0.1058714

```

Lampiran 38. *Output Hasil Uji Ljung-Box dan Uji Kolmogorov-Smirnov pada Sisaan Model Overfitting ARIMA(0,1,0)(0,0,2)<sup>12</sup>*

```

> Box.test(overfit.d1$residuals,type = "Ljung-Box")

Box-Ljung test

data: overfit.d1$residuals
X-squared = 1.4774, df = 1, p-value = 0.2242

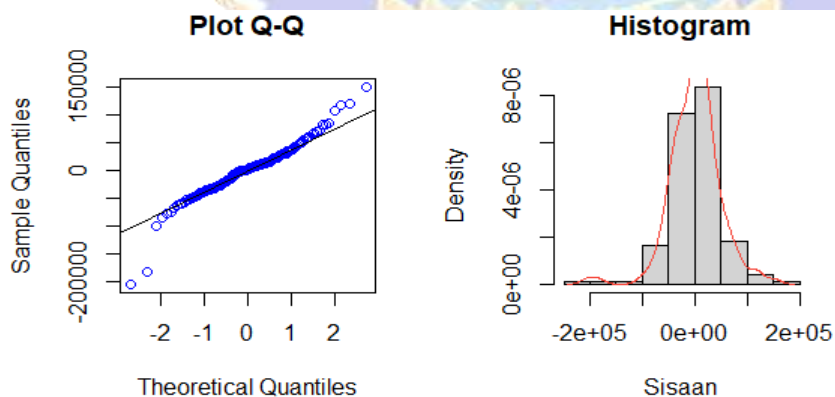
> ks.test(overfit.d1$residuals,"pnorm")

Asymptotic one-sample kolmogorov-smirnov test

data: overfit.d1$residuals
D = 0.53472, p-value < 2.2e-16
alternative hypothesis: two-sided

```

Lampiran 39. *Plot Sebaran normal sisaan model overfit ARIMA(0,1,0)(0,0,2)<sup>12</sup>*



Lampiran 40. *Output* Hasil Prediksi Peramalan Data Jumlah Keberangkatan Penumpang dengan model  $ARIMA(0,1,0)(0,0,2)^{12}$  12 periode kedepan

```
> forecasting.dep<-forecast(departure,model=overfit.d1,h=12)
> forecasting.dep
      Point Forecast      Lo 80      Hi 80      Lo 95      Hi 95
Jan 2022  301006.3 239475.66 362537.0 206903.284 395109.4
Feb 2022  272397.5 185380.00 359415.0 139315.701 405479.3
Mar 2022  272650.2 166075.94 379224.5 109658.930 435641.5
Apr 2022  253156.6 130095.23 376218.0  64950.477 441362.7
May 2022  250869.3 113282.52 388456.1  40448.470 461290.1
Jun 2022  260062.9 109344.17 410781.7  29558.466 490567.4
Jul 2022  199556.6  36761.73 362351.5 -49416.673 448529.9
Aug 2022  200152.5  26117.41 374187.5 -66011.176 466316.1
Sep 2022  235134.8  50542.75 419726.8 -47174.372 517444.0
Oct 2022  279170.6  84593.49 473747.7 -18409.407 576750.6
Nov 2022  308254.0 104179.80 512328.2 -3850.542 620358.5
Dec 2022  327117.2 113968.65 540265.7  1134.635 653099.7
```

Lampiran 41. *Output* Model Aditif Data Jumlah Kedatangan Penumpang

```
> hw.add.arr <- holtwinters(arrival, seasonal="additive")
> hw.add.arr
Holt-winters exponential smoothing with trend and additive seasonal component.

Call:
holtwinters(x = arrival, seasonal = "additive")

Smoothing parameters:
alpha: 0.878443
beta : 0
gamma: 1

Coefficients:
      [,1]
a  304601.902
b   4198.744
s1 -44766.732
s2 -45620.622
s3 -31485.762
s4 -37823.908
s5 -24256.015
s6  29246.446
s7  18032.739
s8  20511.321
s9  -5402.388
s10 10678.531
s11 -3343.717
s12 49304.098
```

Lampiran 42. Nilai Pemulusan Data Jumlah Kedatangan Penumpang Domestik di Bandara Internasional I Gusti Ngurah Rai dengan Model Aditif

Waktu	P.gabungan	P.level	P.tren	P.musiman
Jan 2011	215555.93	219561.57	4198.74	-8204.38
Feb 2011	224977.74	246478.67	4198.74	-25699.67
Mar 2011	231615.88	253729.35	4198.74	-26312.22
Apr 2011	245336.33	258283.97	4198.74	-17146.38
May 2011	262730.65	261842.92	4198.74	-3311.01
Jun 2011	298526.70	265934.80	4198.74	28393.16
Jul 2011	308508.79	270005.55	4198.74	34304.49
Aug 2011	253926.19	277735.82	4198.74	-28008.38
Sep 2011	293925.15	283649.13	4198.74	6077.29
Oct 2011	295468.28	278709.29	4198.74	12560.24

Nov	2011	266675.63	273918.68	4198.74	-11441.80
Dec	2011	342749.99	299762.59	4198.74	38788.66
Jan	2012	281307.00	282168.93	4198.74	-5060.67
Feb	2012	266081.42	287160.02	4198.74	-25277.35
Mar	2012	258183.63	280247.86	4198.74	-26262.97
Apr	2012	285932.30	298968.47	4198.74	-17234.92
May	2012	302550.94	301677.99	4198.74	-3325.80
Jun	2012	339755.47	307181.28	4198.74	28375.45
Jul	2012	348301.04	309309.12	4198.74	34793.18
Aug	2012	279458.26	303030.64	4198.74	-27771.13
Sep	2012	360591.44	351579.99	4198.74	4812.71
Oct	2012	346898.17	331383.10	4198.74	11316.32
Nov	2012	331746.73	335994.57	4198.74	-8446.59
Dec	2012	394418.99	354447.17	4198.74	35773.08
Jan	2013	353009.50	353761.78	4198.74	-4951.02
Feb	2013	303499.54	326115.65	4198.74	-26814.86
Mar	2013	302800.34	322855.06	4198.74	-24253.47
Apr	2013	342111.18	355353.43	4198.74	-17440.99
May	2013	339261.07	338207.61	4198.74	-3145.28
Jun	2013	388470.53	356182.91	4198.74	28088.88
Jul	2013	418526.29	380984.19	4198.74	33343.36
Aug	2013	296385.35	313820.60	4198.74	-21633.99
Sep	2013	420622.48	414986.84	4198.74	1436.90
Oct	2013	398311.61	382739.44	4198.74	11373.43
Nov	2013	347771.13	350046.55	4198.74	-6474.17
Dec	2013	417202.01	377906.05	4198.74	35097.22
Jan	2014	391977.80	397136.70	4198.74	-9357.65
Feb	2014	353626.75	377275.07	4198.74	-27847.06
Mar	2014	327985.71	344124.39	4198.74	-20337.43
Apr	2014	320835.15	337031.01	4198.74	-20394.61
May	2014	359954.00	356994.16	4198.74	-1238.91
Jun	2014	416770.20	381631.64	4198.74	30939.82
Jul	2014	391650.48	363983.33	4198.74	23468.40
Aug	2014	341983.87	346000.97	4198.74	-8215.84
Sep	2014	429454.95	428862.64	4198.74	-3606.44
Oct	2014	396296.50	385829.31	4198.74	6268.45
Nov	2014	391462.89	390464.20	4198.74	-3200.05
Dec	2014	425857.05	384481.01	4198.74	37177.30
Jan	2015	387374.41	395862.73	4198.74	-12687.07
Feb	2015	304712.95	333529.60	4198.74	-33015.39
Mar	2015	316431.66	334132.92	4198.74	-21900.01
Apr	2015	317974.31	331988.73	4198.74	-18213.16
May	2015	361206.18	355418.07	4198.74	1589.36
Jun	2015	409095.38	376979.97	4198.74	27916.67

Jul	2015	361601.89	337004.11	4198.74	20399.03
Aug	2015	363616.87	356748.76	4198.74	2669.36
Sep	2015	373711.38	379654.95	4198.74	-10142.31
Oct	2015	370775.38	360247.84	4198.74	6328.80
Nov	2015	390826.74	391237.00	4198.74	-4609.01
Dec	2015	381103.37	338733.36	4198.74	38171.27
Jan	2016	373388.78	391083.63	4198.74	-21893.60
Feb	2016	354163.88	383478.06	4198.74	-33512.92
Mar	2016	364043.36	382622.34	4198.74	-22777.73
Apr	2016	398440.49	409793.81	4198.74	-15552.07
May	2016	411534.42	403343.65	4198.74	3992.03
Jun	2016	468411.81	442409.18	4198.74	21803.89
Jul	2016	398333.65	371584.66	4198.74	22550.24
Aug	2016	475394.25	465937.45	4198.74	5258.05
Sep	2016	438655.60	447865.69	4198.74	-13408.84
Oct	2016	443587.39	429352.64	4198.74	10036.00
Nov	2016	401099.48	409356.09	4198.74	-12455.36
Dec	2016	464789.78	415756.67	4198.74	44834.37
Jan	2017	409692.83	429021.14	4198.74	-23527.06
Feb	2017	383978.20	413991.80	4198.74	-34212.34
Mar	2017	357785.03	373185.10	4198.74	-19598.81
Apr	2017	380524.37	393351.28	4198.74	-17025.65
May	2017	441668.29	428652.72	4198.74	8816.82
Jun	2017	419017.22	403396.14	4198.74	11422.34
Jul	2017	433273.40	394049.10	4198.74	35025.55
Aug	2017	466474.60	460099.55	4198.74	2176.31
Sep	2017	459446.77	471799.67	4198.74	-16551.64
Oct	2017	470136.87	459250.22	4198.74	6687.91
Nov	2017	388190.85	396142.77	4198.74	-12150.67
Dec	2017	429618.66	379331.05	4198.74	46088.86
Jan	2018	359200.87	381189.92	4198.74	-26187.80
Feb	2018	380006.25	416247.61	4198.74	-40440.10
Mar	2018	429543.45	442733.98	4198.74	-17389.28
Apr	2018	445337.63	453860.61	4198.74	-12721.72
May	2018	475231.17	466291.57	4198.74	4740.86
Jun	2018	435861.83	422115.18	4198.74	9547.90
Jul	2018	514169.21	466386.01	4198.74	43584.45
Aug	2018	499439.57	492026.49	4198.74	3214.33
Sep	2018	473253.85	487924.33	4198.74	-18869.22
Oct	2018	489551.68	487978.71	4198.74	-2625.77
Nov	2018	470021.65	480880.96	4198.74	-15058.05
Dec	2018	513119.65	463155.83	4198.74	45765.08
Jan	2019	454605.37	472324.23	4198.74	-21917.61
Feb	2019	375257.97	408415.21	4198.74	-37355.98

Mar	2019	390260.69	402492.56	4198.74	-16430.61
Apr	2019	380725.17	388108.99	4198.74	-11582.57
May	2019	386785.96	384540.40	4198.74	-1953.18
Jun	2019	327645.47	308353.74	4198.74	15092.99
Jul	2019	477600.94	426850.68	4198.74	46551.51
Aug	2019	416641.50	410377.08	4198.74	2065.67
Sep	2019	458346.98	473590.95	4198.74	-19442.71
Oct	2019	442607.31	442597.52	4198.74	-4188.96
Nov	2019	431406.92	445300.01	4198.74	-18091.83
Dec	2019	502356.98	451705.47	4198.74	46452.77
Jan	2020	434352.94	461496.40	4198.74	-31342.21
Feb	2020	392264.53	426822.34	4198.74	-38756.56
Mar	2020	376098.88	390902.13	4198.74	-19001.99
Apr	2020	257471.67	265930.32	4198.74	-12657.40
May	2020	60777.49	69655.48	4198.74	-13076.74
Jun	2020	57920.80	22812.74	4198.74	30909.32
Jul	2020	29683.47	-18206.19	4198.74	43690.92
Aug	2020	5798.13	-8632.67	4198.74	10232.05
Sep	2020	46102.72	66216.50	4198.74	-24312.52
Oct	2020	107538.88	107736.14	4198.74	-4396.01
Nov	2020	110783.39	124371.11	4198.74	-17786.47
Dec	2020	232230.60	180805.25	4198.74	47226.60
Jan	2021	149595.19	182117.79	4198.74	-36721.34
Feb	2021	88066.35	128175.73	4198.74	-44308.13
Mar	2021	90212.05	122889.62	4198.74	-36876.32
Apr	2021	129844.02	166043.76	4198.74	-40398.48
May	2021	172906.91	188847.91	4198.74	-20139.74
Jun	2021	192150.95	163300.02	4198.74	24652.19
Jul	2021	249332.97	200699.55	4198.74	44434.67
Aug	2021	38309.51	14102.26	4198.74	20008.50
Sep	2021	6985.28	21934.68	4198.74	-19148.14
Oct	2021	126992.02	125468.39	4198.74	-2675.11
Nov	2021	219808.96	226168.47	4198.74	-10558.25
Dec	2021	333529.68	282503.72	4198.74	46827.21

---



Lampiran 43. *Output* Hasil Prediksi Peramalan Data Jumlah Kedatangan Penumpang dengan Model Aditif 12 periode kedepan

```
> forecasting.add.arr <- forecast(hw.add.arr, h=12, prediction.interval = TRUE, level=0.95)
> forecasting.add.arr
      Point Forecast      Lo 95      Hi 95
Jan 2022    264033.9 164887.96 363179.9
Feb 2022    267378.8 135411.73 399345.8
Mar 2022    285712.4 127596.35 443828.4
Apr 2022    283573.0 103056.89 464089.0
May 2022    301339.6 100911.49 501767.7
Jun 2022    359040.8 140507.50 577574.1
Jul 2022    352025.9 116776.65 587275.1
Aug 2022    358703.2 107849.51 609556.9
Sep 2022    336988.2  71445.48 602530.9
Oct 2022    357267.9  77807.11 636728.6
Nov 2022    347444.4  54726.60 640162.2
Dec 2022    404290.9  98891.07 709690.8
```

Lampiran 44. *Output* Model Aditif Data Jumlah Keberangkatan Penumpang

```
> hw.add.dep <- Holtwinters(departure.ts, seasonal="additive")
> hw.add.dep
Holt-winters exponential smoothing with trend and additive seasonal component.

Call:
Holtwinters(x = departure.ts, seasonal = "additive")

Smoothing parameters:
alpha: 0.8913801
beta : 0
gamma: 1

Coefficients:
      [,1]
a  302027.999
b   3767.726
s1  3190.886
s2 -50325.503
s3 -32497.009
s4 -38440.305
s5 -22917.506
s6  24402.482
s7  24617.819
s8  24464.574
s9  -5968.408
s10 7433.917
s11 -1138.025
s12 16236.001
```

Lampiran 45. Nilai Pemulusan Data Jumlah Keberangkatan Penumpang Domestik dengan Model Aditif

Waktu	P.gabungan	P.level	P.tren	P.musiman
Jan 2011	243293.14	222731.91	3767.73	16793.50
Feb 2011	220518.38	247018.19	3767.73	-30267.54
Mar 2011	229636.24	252609.34	3767.73	-26740.83
Apr 2011	241967.86	256255.63	3767.73	-18055.50
May 2011	261550.40	260210.67	3767.73	-2428.00
Jun 2011	280195.75	264206.23	3767.73	12221.80
Jul 2011	311462.66	268307.55	3767.73	39387.38
Aug 2011	272351.14	281471.62	3767.73	-12888.20
Sep 2011	267682.93	257478.08	3767.73	6437.13
Oct 2011	305322.27	289358.21	3767.73	12196.34
Nov 2011	268983.00	276838.40	3767.73	-11623.12
Dec 2011	316325.25	297590.48	3767.73	14967.05

Jan	2012	309890.91	286829.38	3767.73	19293.81
Feb	2012	263807.02	290084.64	3767.73	-30045.34
Mar	2012	254844.56	277832.46	3767.73	-26755.63
Apr	2012	277084.66	291349.60	3767.73	-18032.67
May	2012	306826.92	305459.43	3767.73	-2400.23
Jun	2012	319596.24	303566.07	3767.73	12262.45
Jul	2012	348504.94	304204.84	3767.73	40532.38
Aug	2012	291803.02	304306.37	3767.73	-16271.08
Sep	2012	359779.01	346148.49	3767.73	9862.79
Oct	2012	330754.03	316774.70	3767.73	10211.60
Nov	2012	324995.04	330780.79	3767.73	-9553.48
Dec	2012	364109.81	347145.47	3767.73	13196.62
Jan	2013	362083.83	339084.74	3767.73	19231.36
Feb	2013	289535.88	317765.62	3767.73	-31997.46
Mar	2013	297937.44	319737.32	3767.73	-25567.60
Apr	2013	333552.82	346557.53	3767.73	-16772.43
May	2013	335448.48	334770.82	3767.73	-3090.07
Jun	2013	364986.08	349337.19	3767.73	11881.16
Jul	2013	420521.84	376668.48	3767.73	40085.63
Aug	2013	301491.26	309355.03	3767.73	-11631.49
Sep	2013	404890.88	395298.85	3767.73	5824.30
Oct	2013	387237.56	372010.63	3767.73	11459.21
Nov	2013	340961.69	345212.43	3767.73	-8018.47
Dec	2013	395665.17	380142.19	3767.73	11755.26
Jan	2014	412626.62	392684.51	3767.73	16174.38
Feb	2014	356390.19	384838.78	3767.73	-32216.32
Mar	2014	338491.22	357482.02	3767.73	-22758.52
Apr	2014	340625.01	355525.11	3767.73	-18667.82
May	2014	351868.93	349875.39	3767.73	-1774.19
Jun	2014	398240.76	379720.51	3767.73	14752.52
Jul	2014	426839.84	391648.15	3767.73	31423.97
Aug	2014	327611.27	325461.39	3767.73	-1617.85
Sep	2014	451659.22	445364.12	3767.73	2527.38
Oct	2014	394821.57	383319.27	3767.73	7734.57
Nov	2014	381554.83	382008.30	3767.73	-4221.19
Dec	2014	401616.06	385023.85	3767.73	12824.49
Jan	2015	397778.02	379251.07	3767.73	14759.22
Feb	2015	312904.53	345145.83	3767.73	-36009.02
Mar	2015	311226.84	330915.22	3767.73	-23456.11
Apr	2015	322664.46	338712.13	3767.73	-19815.39
May	2015	357773.17	352601.96	3767.73	1403.49
Jun	2015	391789.90	372275.31	3767.73	15746.85
Jul	2015	370971.99	344304.65	3767.73	22899.61
Aug	2015	372916.09	356614.49	3767.73	12533.88

Sep	2015	387028.43	388752.98	3767.73	-5492.27
Oct	2015	350785.58	339902.15	3767.73	7115.70
Nov	2015	347117.62	347662.74	3767.73	-4312.85
Dec	2015	339950.58	324520.93	3767.73	11661.93
Jan	2016	375775.65	361863.75	3767.73	10144.17
Feb	2016	332644.90	367079.39	3767.73	-38202.22
Mar	2016	355806.32	375003.72	3767.73	-22965.13
Apr	2016	392904.50	407718.73	3767.73	-18581.96
May	2016	379569.02	372459.61	3767.73	3341.69
Jun	2016	434805.93	419158.86	3767.73	11879.35
Jul	2016	403361.43	375653.19	3767.73	23940.51
Aug	2016	495438.53	475679.78	3767.73	15991.02
Sep	2016	453406.35	461542.77	3767.73	-11904.15
Oct	2016	456524.29	445154.30	3767.73	7602.26
Nov	2016	422343.31	426167.51	3767.73	-7591.93
Dec	2016	440355.84	420834.87	3767.73	15753.25
Jan	2017	452609.08	438520.74	3767.73	10320.61
Feb	2017	404861.74	438789.73	3767.73	-37695.72
Mar	2017	384572.09	400242.09	3767.73	-19437.73
Apr	2017	379033.64	398603.52	3767.73	-23337.61
May	2017	452347.40	440006.53	3767.73	8573.14
Jun	2017	444967.69	435081.16	3767.73	6118.81
Jul	2017	432594.07	393156.12	3767.73	35670.22
Aug	2017	516792.85	499215.89	3767.73	13809.23
Sep	2017	482866.78	493459.36	3767.73	-14360.30
Oct	2017	482130.72	473533.50	3767.73	4829.49
Nov	2017	411510.26	416443.40	3767.73	-8700.87
Dec	2017	402405.04	381188.06	3767.73	17449.26
Jan	2018	392050.05	378388.06	3767.73	9894.27
Feb	2018	394479.05	433563.41	3767.73	-42852.09
Mar	2018	427643.09	443971.88	3767.73	-20096.52
Apr	2018	432026.58	447010.38	3767.73	-18751.53
May	2018	494478.65	483197.08	3767.73	7513.84
Jun	2018	437232.22	432913.62	3767.73	550.88
Jul	2018	525500.49	473597.66	3767.73	48135.11
Aug	2018	512428.09	496011.73	3767.73	12648.64
Sep	2018	484146.02	497625.80	3767.73	-17247.50
Oct	2018	484721.38	483540.05	3767.73	-2586.40
Nov	2018	475158.01	484846.34	3767.73	-13456.05
Dec	2018	478366.36	457949.69	3767.73	16648.94
Jan	2019	479437.25	459510.93	3767.73	16158.59
Feb	2019	380161.52	418436.67	3767.73	-42042.88
Mar	2019	385063.48	401481.13	3767.73	-20185.38
Apr	2019	380745.43	391778.79	3767.73	-14801.08

May 2019	385578.04	380882.93	3767.73	927.38
Jun 2019	307748.12	298931.05	3767.73	5049.35
Jul 2019	492561.33	438386.33	3767.73	50407.27
Aug 2019	428812.82	412658.89	3767.73	12386.21
Sep 2019	446684.65	462339.98	3767.73	-19423.05
Oct 2019	447790.86	446909.47	3767.73	-2886.34
Nov 2019	426693.07	440118.03	3767.73	-17192.69
Dec 2019	471537.13	451389.33	3767.73	16380.07
Jan 2020	450797.51	436335.45	3767.73	10694.33
Feb 2020	401571.78	442372.18	3767.73	-44568.13
Mar 2020	379402.78	397461.84	3767.73	-21826.79
Apr 2020	276197.28	289017.49	3767.73	-16587.93
May 2020	80167.59	85917.92	3767.73	-9518.05
Jun 2020	45737.06	20385.66	3767.73	21583.67
Jul 2020	44123.29	-6457.55	3767.73	46813.11
Aug 2020	16609.15	-5139.59	3767.73	17981.02
Sep 2020	40044.63	58039.37	3767.73	-21762.47
Oct 2020	97846.20	98251.51	3767.73	-4173.03
Nov 2020	90955.16	103465.77	3767.73	-16278.33
Dec 2020	195239.24	177384.97	3767.73	14086.55
Jan 2021	190587.31	175848.77	3767.73	10970.82
Feb 2021	69039.00	115771.11	3767.73	-50499.84
Mar 2021	89236.74	120969.50	3767.73	-35500.49
Apr 2021	111356.82	149385.01	3767.73	-41795.92
May 2021	166495.37	180690.31	3767.73	-17962.66
Jun 2021	165417.78	143796.51	3767.73	17853.55
Jul 2021	251589.84	201307.52	3767.73	46514.59
Aug 2021	54369.53	25381.18	3767.73	25220.63
Sep 2021	9390.65	22944.43	3767.73	-17321.51
Oct 2021	119651.37	119880.41	3767.73	-3996.77
Nov 2021	213490.84	217453.08	3767.73	-7729.97
Dec 2021	292524.98	275317.03	3767.73	13440.23

Lampiran 46. *Output* Hasil Prediksi Peramalan Data Jumlah Keberangkatan Penumpang dengan Model Aditif 12 periode kedepan

```
> forecasting.add.dep <- forecast(hw.add.dep, h=12, prediction.interval = TRUE, level=0.95)
> forecasting.add.dep
      Point Forecast      Lo 95      Hi 95
Jan 2022    308986.6  208657.42  409315.8
Feb 2022    259237.9  124835.83  393640.1
Mar 2022    280834.2  119397.14  442271.2
Apr 2022    278658.6   94105.36  463211.8
May 2022    297949.1   92868.94  503029.3
Jun 2022    349036.8  125305.16  572768.5
Jul 2022    353019.9  112076.24  593963.6
Aug 2022    356634.4   99628.88  613639.9
Sep 2022    329969.1   57848.17  602090.1
Oct 2022    347139.2   60699.31  633579.0
Nov 2022    342335.0   42258.67  642411.2
Dec 2022    363476.7   50357.30  676596.1
```

Lampiran 47. *Output Model Multiplikatif Data Jumlah Kedatangan Penumpang*

```
> hw.multi.arr <- Holtwinters(arrival.ts, seasonal="multiplicative")
> hw.multi.arr
Holt-winters exponential smoothing with trend and multiplicative seasonal component.
```

```
Call:
Holtwinters(x = arrival.ts, seasonal = "multiplicative")
```

```
Smoothing parameters:
alpha: 0.8333508
beta : 0.04669016
gamma: 0.4856377
```

```
Coefficients:
      [,1]
a  2.995191e+05
b  2.831416e+03
s1  8.674656e-01
s2  8.805175e-01
s3  9.209036e-01
s4  7.091551e-01
s5  6.140951e-01
s6  1.335765e+00
s7  9.934841e-01
s8  1.076798e+00
s9  1.043589e+00
s10 1.089924e+00
s11 1.016651e+00
s12 1.169720e+00
```

Lampiran 48. Nilai Pemulusan Data Jumlah Kedatangan Penumpang Domestik di Bandara Internasional I Gusti Ngurah Rai dengan Model Multiplikatif

waktu	P.gabungan	P.level	P.tren	P.musiman
Jan 2011	216188.39	219561.57	4198.74	0.97
Feb 2011	225151.36	245521.83	5214.79	0.90
Mar 2011	232518.94	253799.77	5357.81	0.90
Apr 2011	246475.39	258695.08	5336.22	0.93
May 2011	264007.28	262364.27	5258.38	0.99
Jun 2011	299885.84	266441.44	5203.23	1.10
Jul 2011	317463.01	270508.71	5150.19	1.15
Aug 2011	242921.36	272088.59	4983.50	0.88
Sep 2011	302383.62	289387.45	5558.50	1.03
Oct 2011	299329.83	279614.23	4842.66	1.05
Nov 2011	264110.74	273294.58	4321.49	0.95
Dec 2011	355201.23	301446.90	5434.16	1.16
Jan 2012	276982.04	280054.97	4181.64	0.97
Feb 2012	263497.71	288706.59	4390.35	0.90
Mar 2012	258102.49	283767.33	3954.75	0.90
Apr 2012	287184.66	303154.86	4675.30	0.93
May 2012	305433.47	305197.13	4552.37	0.99
Jun 2012	345472.19	308568.46	4497.23	1.10
Jul 2012	357915.12	306968.23	4212.53	1.15
Aug 2012	263280.36	295573.42	3483.82	0.88
Sep 2012	375875.33	362162.53	6430.22	1.02
Oct 2012	354466.24	333407.74	4787.43	1.05
Nov 2012	323139.41	332551.38	4523.92	0.96
Dec 2012	417617.89	358662.90	5531.85	1.15



Jan	2013	339481.84	343294.34	4556.00	0.98
Feb	2013	297605.64	328446.61	3650.04	0.90
Mar	2013	300392.87	329681.02	3537.25	0.90
Apr	2013	345134.37	365224.42	5031.63	0.93
May	2013	344720.51	345830.50	3891.19	0.99
Jun	2013	399427.95	358365.05	4294.75	1.10
Jul	2013	431225.25	372114.80	4736.21	1.14
Aug	2013	277516.12	308439.91	1542.08	0.90
Sep	2013	441528.77	430297.89	7159.65	1.01
Oct	2013	408815.65	385939.44	4754.26	1.05
Nov	2013	339114.56	348881.66	2802.05	0.96
Dec	2013	440781.46	382443.20	4238.22	1.14
Jan	2014	374523.97	381953.27	4017.46	0.97
Feb	2014	341237.66	377437.51	3619.04	0.90
Mar	2014	323051.60	353019.00	2309.96	0.91
Apr	2014	324051.74	348068.83	1970.99	0.93
May	2014	361501.29	363298.85	2590.05	0.99
Jun	2014	428009.88	384208.72	3445.41	1.10
Jul	2014	405949.51	360399.24	2172.87	1.12
Aug	2014	307077.37	333135.27	798.46	0.92
Sep	2014	451072.64	446718.74	6064.41	1.00
Oct	2014	406279.62	389722.24	3120.09	1.03
Nov	2014	377017.62	385198.13	2763.18	0.97
Dec	2014	447771.72	390409.06	2877.47	1.14
Jan	2015	373380.68	383231.23	2407.98	0.97
Feb	2015	295388.76	332494.91	-73.33	0.89
Mar	2015	306205.47	337327.57	155.73	0.91
Apr	2015	316363.84	340243.80	284.62	0.93
May	2015	360187.57	361609.95	1268.92	0.99
Jun	2015	419121.86	380329.01	2083.67	1.10
Jul	2015	373519.31	336552.38	-57.56	1.11
Aug	2015	321244.09	340833.90	145.03	0.94
Sep	2015	392297.08	397296.99	2774.53	0.98
Oct	2015	374082.96	361438.25	970.74	1.03
Nov	2015	375686.59	384360.73	1995.67	0.97
Dec	2015	390694.27	344012.32	18.62	1.14
Jan	2016	361051.58	377216.92	1568.08	0.95
Feb	2016	337561.70	377822.78	1523.15	0.89
Mar	2016	355498.45	389505.41	1997.50	0.91
Apr	2016	398786.37	423345.72	3484.24	0.93
May	2016	417420.34	415708.76	2964.99	1.00
Jun	2016	487984.04	446930.31	4284.30	1.08
Jul	2016	412142.64	370323.71	507.49	1.11
Aug	2016	421241.13	437430.40	3617.02	0.96

Sep	2016	457021.50	466177.15	4790.33	0.97
Oct	2016	452550.01	432991.78	3017.24	1.04
Nov	2016	392323.77	406698.66	1648.73	0.96
Dec	2016	481316.52	418133.46	2105.64	1.15
Jan	2017	397968.13	415723.23	1894.80	0.95
Feb	2017	365950.17	408729.52	1479.79	0.89
Mar	2017	346862.87	379191.07	31.54	0.91
Apr	2017	379275.16	405734.72	1269.40	0.93
May	2017	443968.86	439784.60	2799.92	1.00
Jun	2017	438479.39	412817.12	1410.08	1.06
Jul	2017	436352.35	386765.75	127.90	1.13
Aug	2017	421572.23	436644.60	2450.78	0.96
Sep	2017	471535.58	485482.30	4616.59	0.96
Oct	2017	480778.71	463114.11	3356.67	1.03
Nov	2017	381304.18	395915.29	62.42	0.96
Dec	2017	435471.11	381238.59	-625.75	1.14
Jan	2018	355169.13	374409.96	-915.36	0.95
Feb	2018	361530.38	407813.18	686.98	0.89
Mar	2018	416424.20	449787.91	2614.71	0.92
Apr	2018	445770.29	471420.24	3502.64	0.94
May	2018	484835.58	482859.12	3873.19	1.00
Jun	2018	456213.22	432625.68	1346.94	1.05
Jul	2018	520307.01	454001.43	2282.09	1.14
Aug	2018	457893.53	469636.09	2905.52	0.97
Sep	2018	482490.70	500144.89	4194.32	0.96
Oct	2018	502174.00	492183.45	3626.77	1.01
Nov	2018	458071.22	474843.88	2647.85	0.96
Dec	2018	534949.42	466192.60	2120.29	1.14
Jan	2019	439168.01	456514.40	1569.42	0.96
Feb	2019	359982.63	404108.06	-950.72	0.89
Mar	2019	375058.79	406660.35	-787.16	0.92
Apr	2019	375545.60	400505.76	-1037.77	0.94
May	2019	388713.32	396221.33	-1189.36	0.98
Jun	2019	328357.10	315901.03	-4883.99	1.06
Jul	2019	472302.40	413160.27	-114.91	1.14
Aug	2019	388724.19	399756.22	-735.38	0.97
Sep	2019	461381.43	480370.72	3062.86	0.95
Oct	2019	450905.29	445802.57	1305.86	1.01
Nov	2019	420884.96	438844.03	919.99	0.96
Dec	2019	515661.01	451113.17	1449.89	1.14
Jan	2020	424593.33	447488.74	1212.97	0.95
Feb	2020	373655.33	418325.40	-205.31	0.89
Mar	2020	361307.22	392884.89	-1383.54	0.92
Apr	2020	249043.03	272077.60	-6959.46	0.94

May	2020	51914.35	70136.83	-16063.17	0.96
Jun	2020	-7272.86	11331.53	-18058.80	1.08
Jul	2020	-15634.65	3847.71	-17565.06	1.14
Aug	2020	8002.66	23890.85	-15809.12	0.99
Sep	2020	57907.65	73912.38	-12735.48	0.95
Oct	2020	77223.48	88187.85	-11474.33	1.01
Nov	2020	99562.24	113529.99	-9755.37	0.96
Dec	2020	180153.15	165172.04	-6888.71	1.14
Jan	2021	177384.13	194008.02	-5220.72	0.94
Feb	2021	85545.59	105438.61	-9112.28	0.89
Mar	2021	69874.40	88559.80	-9474.90	0.88
Apr	2021	91526.29	140094.41	-6626.36	0.69
May	2021	123209.69	205771.58	-3250.50	0.61
Jun	2021	304026.83	224210.72	-2237.80	1.37
Jul	2021	226742.71	176899.37	-4342.30	1.31
Aug	2021	41992.99	49136.57	-10104.82	1.08
Sep	2021	28553.54	39382.64	-10088.44	0.97
Oct	2021	104976.17	107534.38	-6435.39	1.04
Nov	2021	204217.00	206934.81	-1493.90	0.99
Dec	2021	312463.43	268269.01	1439.56	1.16

#### Lampiran 49. *Output* Model Multiplikatif Data Jumlah Keberangkatan Penumpang

```

> hw.multi.dep <- Holtwinters(departure.ts, seasonal="multiplicative")
> hw.multi.dep
Holt-winters exponential smoothing with trend and multiplicative seasonal component.

Call:
Holtwinters(x = departure.ts, seasonal = "multiplicative")

Smoothing parameters:
alpha: 0.8450642
beta : 0.03106816
gamma: 0.5397609

Coefficients:
[,1]
a 2.954762e+05
b 6.868515e+02
s1 1.004759e+00
s2 8.412934e-01
s3 9.143293e-01
s4 7.310302e-01
s5 5.451171e-01
s6 1.119035e+00
s7 9.995661e-01
s8 1.078560e+00
s9 1.045036e+00
s10 1.082675e+00
s11 1.029428e+00
s12 1.066646e+00

```

Lampiran 50. Nilai Pemulusan Data Jumlah Keberangkatan Penumpang Domestik di Bandara Internasional I Gusti Ngurah Rai dengan Model Multiplikatif

waktu	P.gabungan	P.level	P.tren	P.musiman
Jan 2011	241342.27	222731.91	3767.73	1.07
Feb 2011	220308.89	246302.94	4382.98	0.88
Mar 2011	230070.58	252854.40	4450.35	0.89
Apr 2011	242673.67	256765.50	4433.60	0.93
May 2011	262296.08	260748.25	4419.59	0.99
Jun 2011	280948.55	264749.15	4406.58	1.04
Jul 2011	320241.60	268849.26	4397.06	1.17
Aug 2011	262934.92	274517.09	4436.54	0.94
Sep 2011	270088.23	259473.52	3831.33	1.03
Oct 2011	306358.74	287305.59	4576.99	1.05
Nov 2011	266460.01	276336.47	4094.00	0.95
Dec 2011	322363.74	299620.41	4690.19	1.06
Jan 2012	312136.43	286490.93	4136.57	1.07
Feb 2012	257253.10	288408.30	4067.62	0.88
Mar 2012	254989.39	281505.76	3726.80	0.89
Apr 2012	278190.53	295434.75	4043.76	0.93
May 2012	309925.65	309027.48	4340.43	0.99
Jun 2012	322902.16	305293.66	4089.58	1.04
Jul 2012	360882.77	303864.30	3918.12	1.17
Aug 2012	280153.56	295897.17	3548.86	0.94
Sep 2012	365733.67	348550.28	5074.44	1.03
Oct 2012	336463.48	318380.02	3979.45	1.04
Nov 2012	316657.78	327036.38	4124.76	0.96
Dec 2012	374546.08	351018.74	4741.70	1.05
Jan 2013	365832.04	336732.06	4150.52	1.07
Feb 2013	279623.59	315769.79	3370.31	0.88
Mar 2013	296344.85	326757.07	3606.96	0.90
Apr 2013	336027.33	356227.87	4410.50	0.93
May 2013	341714.92	342567.84	3849.08	0.99
Jun 2013	370295.98	351426.93	4004.73	1.04
Jul 2013	440406.70	372567.05	4537.10	1.17
Aug 2013	291520.39	305013.79	2297.38	0.95
Sep 2013	412688.49	398319.80	5124.85	1.02
Oct 2013	393082.45	371927.18	4145.66	1.05
Nov 2013	333430.71	343623.48	3137.52	0.96
Dec 2013	406623.75	384103.56	4297.69	1.05
Jan 2014	417136.18	387501.42	4269.73	1.06
Feb 2014	335198.83	377851.49	3837.27	0.88
Mar 2014	336007.61	368480.82	3426.93	0.90
Apr 2014	344374.34	368223.75	3312.47	0.93
May 2014	356990.26	358485.59	2907.01	0.99

Jun	2014	403540.92	382038.66	3548.45	1.05
Jul	2014	447487.92	388699.15	3645.13	1.14
Aug	2014	310674.75	318898.42	1363.30	0.97
Sep	2014	460367.59	448514.02	5347.87	1.01
Oct	2014	402076.95	385095.50	3211.42	1.04
Nov	2014	369508.01	377735.72	2882.99	0.97
Dec	2014	411926.30	390370.63	3185.97	1.05
Jan	2015	402332.00	376590.91	2658.88	1.06
Feb	2015	300391.60	341776.97	1494.66	0.88
Mar	2015	304277.03	335856.45	1264.29	0.90
Apr	2015	322743.06	347859.85	1597.93	0.92
May	2015	359199.62	359776.34	1918.51	0.99
Jun	2015	395932.32	375664.97	2352.54	1.05
Jul	2015	387088.66	345947.47	1356.18	1.11
Aug	2015	342698.64	342349.78	1202.27	1.00
Sep	2015	397517.76	396114.94	2835.30	1.00
Oct	2015	352107.74	339989.88	1003.51	1.03
Nov	2015	335427.18	343577.27	1083.79	0.97
Dec	2015	343012.25	328598.57	584.76	1.04
Jan	2016	376407.13	357247.59	1456.66	1.05
Feb	2016	315202.39	359503.83	1481.51	0.87
Mar	2016	348123.77	382379.35	2146.18	0.91
Apr	2016	393920.94	422009.45	3310.73	0.93
May	2016	385231.61	384444.56	2040.80	1.00
Jun	2016	441761.40	422517.81	3160.27	1.04
Jul	2016	421222.80	376828.84	1642.61	1.11
Aug	2016	455457.25	446904.65	3768.70	1.01
Sep	2016	461837.07	467309.10	4285.55	0.98
Oct	2016	463215.40	444807.01	3453.30	1.03
Nov	2016	411174.65	421912.72	2634.73	0.97
Dec	2016	449494.80	425384.53	2660.74	1.05
Jan	2017	457700.94	433256.11	2822.63	1.05
Feb	2017	378786.12	428818.82	2597.08	0.88
Mar	2017	376988.16	410822.55	1957.28	0.91
Apr	2017	381405.44	414185.21	2000.94	0.92
May	2017	458432.08	452932.48	3142.58	1.01
Jun	2017	456390.40	442760.52	2728.92	1.02
Jul	2017	446173.62	393783.18	1122.51	1.13
Aug	2017	480776.00	470582.46	3473.64	1.01
Sep	2017	486048.72	495164.06	4129.43	0.97
Oct	2017	489645.35	473456.71	3326.73	1.03
Nov	2017	402789.84	414419.77	1389.20	0.97
Dec	2017	405472.11	385225.26	439.02	1.05
Jan	2018	395506.88	377276.73	178.44	1.05



Feb	2018	369306.61	421179.33	1536.87	0.87
Mar	2018	417320.84	454271.14	2517.22	0.91
Apr	2018	432674.34	465579.56	2790.35	0.92
May	2018	505951.96	501047.44	3805.58	1.00
Jun	2018	450939.25	444046.99	1916.45	1.01
Jul	2018	541483.02	469119.90	2635.88	1.15
Aug	2018	486962.04	475389.86	2748.78	1.02
Sep	2018	484696.02	497264.40	3342.98	0.97
Oct	2018	491101.96	482645.90	2784.95	1.01
Nov	2018	461646.81	477794.52	2547.71	0.96
Dec	2018	486706.64	461974.09	1977.04	1.05
Jan	2019	483717.12	455238.55	1706.36	1.06
Feb	2019	363933.23	413369.22	352.54	0.88
Mar	2019	372639.51	406977.60	143.01	0.92
Apr	2019	376274.65	404639.34	65.92	0.93
May	2019	389056.41	393816.77	-272.36	0.99
Jun	2019	310366.10	308367.98	-2918.64	1.02
Jul	2019	494869.00	429871.44	946.93	1.15
Aug	2019	413956.89	404777.22	137.88	1.02
Sep	2019	445296.25	459772.07	1842.18	0.96
Oct	2019	449745.96	443962.86	1293.79	1.01
Nov	2019	416084.95	433710.37	935.07	0.96
Dec	2019	474211.28	451440.88	1456.87	1.05
Jan	2020	455219.85	433697.84	860.36	1.05
Feb	2020	381019.88	433044.14	813.32	0.88
Mar	2020	366705.08	401085.18	-204.85	0.91
Apr	2020	271542.79	296314.87	-3453.51	0.93
May	2020	72786.08	85587.92	-9893.11	0.96
Jun	2020	2135.31	13857.25	-11814.29	1.05
Jul	2020	-2341.23	9530.40	-11581.67	1.14
Aug	2020	20419.33	30316.31	-10576.07	1.03
Sep	2020	59666.64	71078.55	-8981.08	0.96
Oct	2020	72935.64	80798.42	-8400.08	1.01
Nov	2020	83540.55	94655.56	-7708.59	0.96
Dec	2020	164013.38	162686.53	-5355.50	1.04
Jan	2021	181268.97	177820.31	-4718.93	1.05
Feb	2021	101518.98	122820.44	-6281.07	0.87
Mar	2021	70073.53	86587.65	-7211.62	0.88
Apr	2021	83449.78	124189.15	-5819.35	0.70
May	2021	99452.46	188852.79	-3629.58	0.54
Jun	2021	243725.97	218945.86	-2581.88	1.13
Jul	2021	252196.85	202848.53	-3001.78	1.26
Aug	2021	63437.60	64445.19	-7208.45	1.11
Sep	2021	36786.01	45015.55	-7588.14	0.98

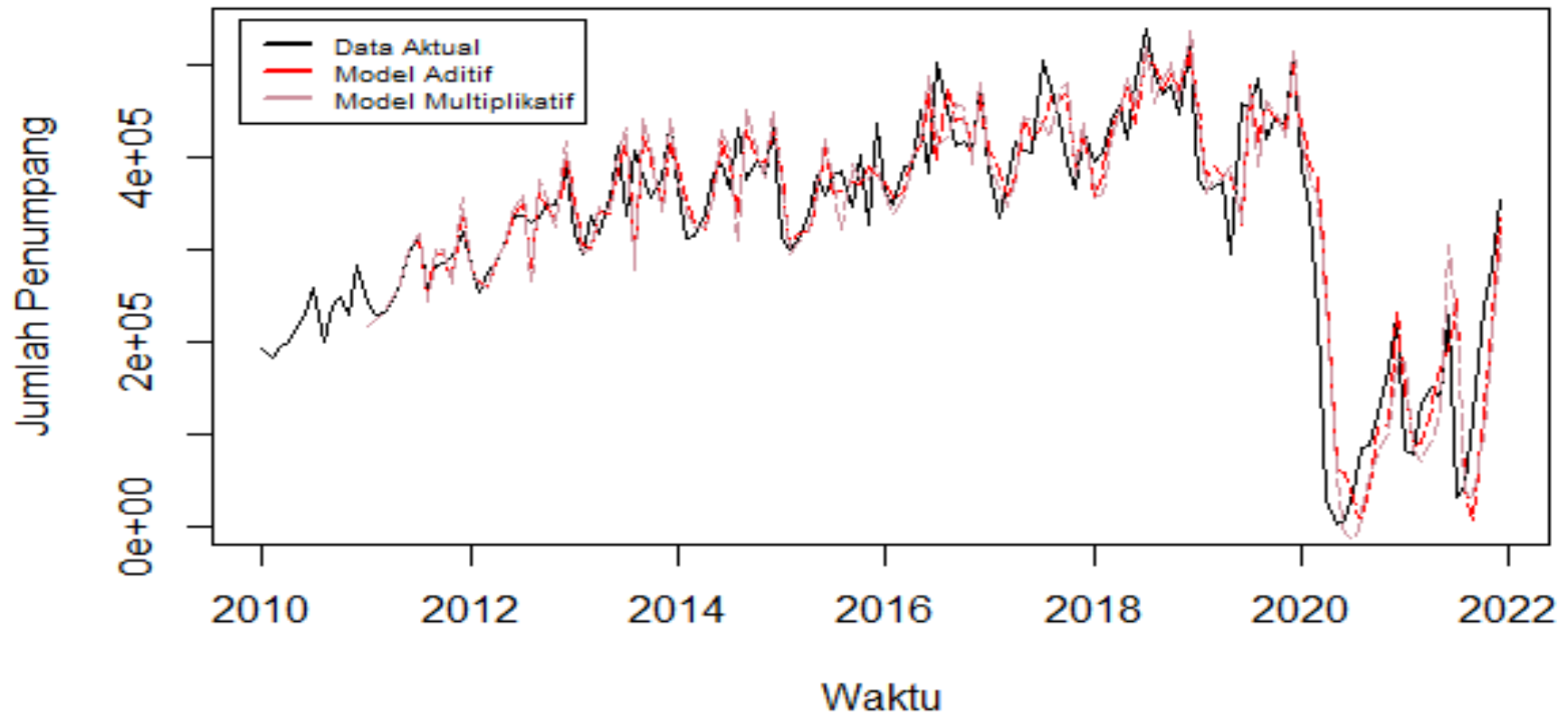
Oct	2021	101243.51	103740.24	-5527.93	1.03
Nov	2021	198195.25	199570.71	-2378.91	1.01
Dec	2021	274854.59	261077.85	-394.08	1.05

Lampiran 51. *Output* Hasil Prediksi Peramalan Data Jumlah Keberangkatan Penumpang dengan Model Multiplikatif 12 periode kedepan

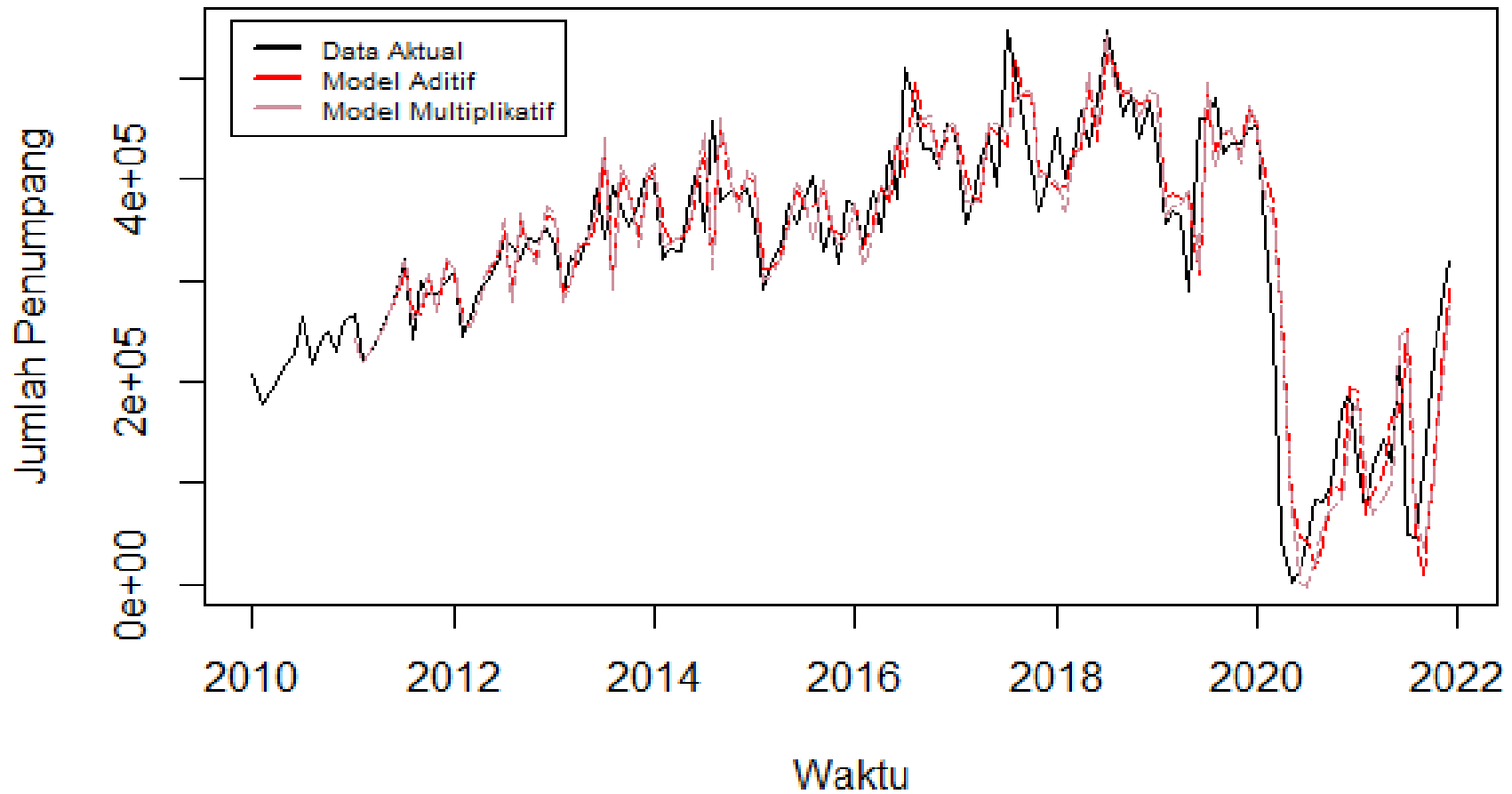
```
> forecasting.multi.dep <- forecast(hw.multi.dep, h=12, prediction.interval = TRUE, level=0.95)
> forecasting.multi.dep
      Point Forecast      Lo 95      Hi 95
Jan 2022      297572.5 202081.365 393063.7
Feb 2022      249737.9 128304.930 371170.8
Mar 2022      272046.6 111881.387 432211.7
Apr 2022      218010.5  58456.824 377564.1
May 2022      162941.2  10603.612 315278.8
Jun 2022      335260.0   9983.214 660536.7
Jul 2022      300153.8 -11588.014 611895.7
Aug 2022      324615.2 -31561.628 680792.0
Sep 2022      315243.5 -49978.966 680465.9
Oct 2022      327341.2 -70706.309 725388.6
Nov 2022      311949.1 -86358.688 710256.9
Dec 2022      323960.1 -97527.221 745447.4
```



Lampiran 52. Plot Perbandingan Model Aditif dan Model Multiplikatif Data Jumlah Kedatangan Penumpang



Lampiran 53. Plot Perbandingan Model Aditif dan Model Multiplikatif Data Jumlah Keberangkatan Penumpang



Lampiran 54. R Codes Data Jumlah Kedatangan Penumpang Domestik dengan Metode *Seasonal* ARIMA

```
#install packages
library(forecast)
library(MASS)
library(fitAR)
library(tsoutliers)
library(lmtest)
library(stargazer)
library(TSA)
library(ggplot2)
library(astsa)
library(fUnitRoots)
library(strucchange)
library(reshape)
library(Rmisc)
library(fBasics)
library(tseries)
library(car)
library(nortest)
library(portes)
library(knitr)
library(AID)
library(fGarch)
library(rugarch)
library('fpp2')
#===== INPUT DATA dan PLOT DATA DERET WAKTU
library(readxl)
arrival <- read_excel('Data kedatangan Penumpang Domestik.xlsx', sheet = "Lembar2")
arrival <- arrival[,c(-1)]
arrival <- ts(arrival,start=c(2010,1),freq=12)
```





```

arrival
plot(arrival, col="navy blue", main="Jumlah Kedatangan Penumpang Penerbangan
      Domestik", xlab="Waktu",
      type="l", ylab="Jumlah Penumpang", lty=1, lwd = 1.5)
mean(arrival)
stdev(arrival)
#=====UJI STASIONER
par(mfrow=c(1,2))
ACF.arr<-Acf(arrival, lag.max = 48)
ACF.arr
PACF.arr<-Pacf(arrival, lag.max = 48)
PACF.arr
#dalam rataaan
adf.test(arrival)
arrival_diffnonmusiman <- diff(arrival, differences = 1)
arrival_diffnonmusiman
par(mfrow=c(1,1))
plot.ts(arrival_diffnonmusiman,ylab="jumlah penumpang",xlab="waktu")
adf.test(arrival_diffnonmusiman)
#dalam ragam
data_positif<-arrival_diffnonmusiman + 199800
lamda<-boxcox(data_positif~1)
lamda
powerTransform(data_positif)
#ACF dan PACF data yang sudah stasioner
par(mfrow=c(1,2))
ACFdiff<-Acf(arrival_diffnonmusiman, lag.max = 48)
ACFdiff
PACFdiff<-Pacf(arrival_diffnonmusiman, lag.max = 48)
PACFdiff
#=====PEMODELAN

```

```

fit.a1<-Arima(arrival, order = c(0,1,0), seasonal=list(order=c(1,0,0), periode=12),
              method = "CSS")
coefstest(fit.a1)
summary(fit.a1)
fit.a2<-Arima(arrival, order = c(0,1,1), seasonal=list(order=c(1,0,0), periode=12),
              method = "CSS")
coefstest(fit.a2)
summary(fit.a2)
fit.a3<-Arima(arrival, order = c(1,1,0), seasonal=list(order=c(1,0,0), periode=12),
              method = "CSS") #signifikan
coefstest(fit.a3)
summary(fit.a3)
#=====DIAGNOSTIK MODEL
#kebebasan sisaan
ljung_box_test1<-LjungBox(fit.a1$residuals)
ljung_box_test1
Box.test(fit.a1$residuals,type = "Ljung-Box")
acf(fit.a1$residuals, main="RACF")
pacf(fit.a1$residuals, main="RPACF")
#kenormalan sisaan
ks.test(fit.a1$residuals,"pnorm")
#lillie.test(fit.a1$residuals)
qqnorm(fit.a1$residuals, col=6, main="Plot Q-Q")
qqline(fit.a1$residuals)
hist(fit.a1$residuals, probability = T, main = "Histogram", xlab = "Sisaan")
lines(density(fit.a1$residuals), col=6)
#===== OVERFITTING
overfit.a1<-Arima(arrival, order = c(0,1,0), seasonal=list(order=c(2,0,0), periode=12),
                 method = "CSS")
coefstest(overfit.a1)
summary(overfit.a1)
overfit.a2<-Arima(arrival, order = c(0,1,0), seasonal=list(order=c(1,0,1), periode=12),
                 method = "CSS")

```

```

coefstest(overfit.a2)
summary(overfit.a2)
#===== FORECAST
par(mfrow=c(1,1))
forecasting.arr<-forecast(arrival,model=fit.a1,h=12)
forecasting.arr
plot(forecasting.arr,main="Forecast data Kedatangan penumpang", ylab="jumlah
penumpang", xlab="waktu")
fit.data.arr=fitted(fit.a1)
lines(fit.data.arr,col="red",type="l",lty=5)
legend("topleft",c("Data aktual","Seasonal ARIMA","forecast"),
col=c("black","red","blue"),lty=1, cex=0.8, text.font=1)

```

Lampiran 55. R Codes Data Jumlah Keberangkatan Penumpang Domestik dengan Metode *Seasonal* ARIMA

```

#install packages
library(forecast)
library(MASS)
library(fitAR)
library(tsoptions)
library(lmtest)
library(stargazer)
library(TSA)
library(ggplot2)
library(astsa)
library(fUnitRoots)
library(strucchange)
library(reshape)
library(Rmisc)
library(fBasics)
library(tseries)
library(car)

```

```

library(nortest)
library(portes)
library(knitr)
library(AID)
library(fGarch)
library(rugarch)
library('fpp2')

#===== INPUT DATA dan PLOT DATA DERET WAKTU
library(readxl)
departure <- read_excel('Data keberangkatan Penumpang Domestik.xlsx', sheet =
                        "Lembar2")
departure <- departure[,c(-1)]
departure <- ts(departure,start=c(2010,1),freq=12)
departure
plot(departure, col="navy blue", main="Jumlah Keberangkatan Penumpang
      Penerbangan Domestik", xlab="Waktu",
      type="l", ylab="Jumlah Penumpang",lty=1, lwd = 1.5)
mean(departure)
stdev(departure)
#=====UJI STASIONER
par(mfrow=c(1,2))
ACF.dep<-Acf(departure, lag.max = 48)
ACF.dep
PACF.dep<-Pacf(departure, lag.max = 48)
PACF.dep
#dalam rataan
adf.test(departure)
departure_diffnonmusiman <- diff(departure, differences = 1)
departure_diffnonmusiman
min(departure_diffnonmusiman)

```

```

par(mfrow=c(1,1))
plot.ts(departure_diffnonmusiman,ylab="jumlah penumpang",xlab="waktu")
adf.test(departure_diffnonmusiman)
#dalam ragam
data_positif<-departure_diffnonmusiman + 209400
lamda<-boxcox(data_positif~1)
lamda
powerTransform(data_positif)
#ACF dan PACF data yang sudah stasioner
par(mfrow=c(1,2))
Acf(departure_diffnonmusiman, lag.max = 48)
Pacf(departure_diffnonmusiman, lag.max = 48)
#=====PEMODELAN
fit.d1<-Arima(departure, order = c(0,1,0), seasonal=list(order=c(0,0,1), periode=12),
method = "CSS")
coefstest(fit.d1)
summary(fit.d1)
#tidak signifikan
fit.d2<-Arima(departure, order = c(1,1,0), seasonal=list(order=c(0,0,1), periode=12),
method = "CSS")
coefstest(fit.d2)
summary(fit.d2)
#tidak signifikan
fit.d3<-Arima(departure, order = c(0,1,1), seasonal=list(order=c(0,0,1), periode=12),
method = "CSS") #signifikan
coefstest(fit.d3)
summary(fit.d3)
#=====DIAGNOSTIK MODEL
#kebebasan sisaan
ljung_box_test1<-LjungBox(fit.d1$residuals)
ljung_box_test1
Box.test(fit.d1$residuals,type = "Ljung-Box")

```



```

acf(fit.d1$residuals, main="RACF")
pacf(fit.d1$residuals, main="RPACF")
#kenormalan sisaan
ks.test(fit.d1$residuals,"pnorm")
#lillie.test(fit.d1$residuals)
qqnorm(fit.d1$residuals, col=6, main="Plot Q-Q")
qqline(fit.d1$residuals)
hist(fit.d1$residuals, probability = T, main = "Histogram", xlab = "Sisaan")
lines(density(fit.d1$residuals), col=6)
#===== OVERFITTING
overfit.d1<-Arima(departure, order = c(0,1,0), seasonal=list(order=c(0,0,2),
periode=12), method = "CSS")
coefest(overfit.d1)
summary(overfit.d1)
overfit.d2<-Arima(departure, order = c(0,1,0), seasonal=list(order=c(1,0,1),
periode=12), method = "CSS")
coefest(overfit.d2)
summary(overfit.d2)
#uji diagnostik
ljung_box_test2<-LjungBox(overfit.d1$residuals)
ljung_box_test2
Box.test(overfit.d1$residuals,type = "Ljung-Box")
acf(overfit.d1$residuals, main="RACF")
pacf(overfit.d1$residuals, main="RPACF")
ks.test(overfit.d1$residuals,"pnorm")
#shapiro.test(overfit.d$residuals)
#ad.test(overfit.d$residuals)
#lillie.test(overfit.d$residuals)
par(mfrow=c(1,2))
qqnorm(overfit.d1$residuals, col="blue", main="Plot Q-Q")
qqline(overfit.d1$residuals)

```

```

hist(overfit.d1$residuals, probability = T, main = "Histogram", xlab = "Sisaan")
lines(density(overfit.d1$residuals), col=2)
#pemilihan model terbaik
summary(fit.d1)
summary(overfit.d1)
#===== FORECAST
par(mfrow=c(1,1))
forecasting.dep<-forecast(departure,model=overfit.d1,h=12)
forecasting.dep
plot(forecasting.dep,main="Forecast data keberangkatan penumpang", ylab="jumlah
penumpang", xlab="waktu")
fit.data.dep=fitted(fit.a1)
lines(fit.data.dep,col="red",type="l",lty=5)
legend("topleft",c("Data aktual","Seasonal ARIMA","Forecast"),
col=c("black","red","blue"),lty=1, cex=0.8, text.font=1)

```

Lampiran 56. R Codes Data Jumlah Kedatangan Penumpang Domestik dengan Metode *Triple Exponential Smoothing Holt-Winters*

```

library(ggplot2)
library(forecast)
# import data
library(readxl)
arr <- read_excel('Data kedatangan Penumpang Domestik.xlsx', sheet = "Lembar2")
# Preprocessing Data
arrival <- arr[,c(-1)]
arrival <- ts(arrival,start=c(2010,1),freq=12)
arrival
plot(arrival, col="black", main="Jumlah Kedatangan Penumpang Penerbangan
Domestik", xlab="waktu",
sub="Januari 2010 sampai November 2021",type="l", ylab="Jumlah
Kedatangan",lty=1, lwd = 1.5)
# Triple Eksponential Smoothing
hw.add.arr <- HoltWinters(arrival, seasonal="additive")

```

```

hw.add.arr
plot(hw.add.arr, main="Holt-Winter Model with Additive")
legend("topleft",c("Data Aktual", "Model Additif"),
      col=c("black", "2"),lty=1, cex=0.8, text.font=1)
hw.multi.arr <- HoltWinters(arrival, seasonal="multiplicative")
hw.multi.arr
plot(hw.multi.arr, main="Holt-Winter Model with Multiplicative")
hw.add.arr$fitted
hw.multi.arr$fitted
# ukuran kesalahan
accuracy(hw.add.arr$fitted, arrival)
accuracy(hw.multi.arr$fitted, arrival)
# prediksi dengan model terbaik yaitu multiplicative
library(forecast)
forecasting.add.arr <- forecast(hw.add.arr, h=12, prediction.interval = TRUE,
                              level=0.95)
forecasting.add.arr
forecasting.multi.arr <- forecast(hw.multi.arr, h=12, prediction.interval = TRUE,
                                 level=0.95)
forecasting.multi.arr
# Plot Peramalan
plot(forecasting.add.arr, main="Peramalan Jumlah Kedatangan Penumpang
Penerbangan Domestik",
     xlab="waktu", col="black", ylab="Jumlah Penumpang", lwd = 1.5)
lines(hw.add.arr$fitted[,1], col="red", lwd = .5,lty=5)
legend("topleft",legend=c("Data Aktual", "Model Aditif", "Peramalan"),
      col=c("black", "red", "blue"), lty = 1, cex=0.8, inset=0.02, lwd = 2)
# Check Residual
acf(forecasting.add.arr$residuals, main="Residuals", lag.max=25, na.action = na.pass)
plot.ts(forecasting.add.arr$residuals, main="Plot Residuals", ylab="Residuals")
Box.test(forecasting.add.arr$residuals, lag=10, type="Ljung-Box")
hist(forecasting.add.arr$residuals)

```

Lampiran 57. R Codes Data Jumlah Keberangkatan Penumpang Domestik dengan Metode *Triple Exponential Smoothing Holt-Winters*

```
library(ggplot2)
library(forecast)
# import data
library(readxl)
dp <- read_excel('Data keberangkatan Penumpang Domestik.xlsx', sheet = "Lembar2")
# Preprocessing Data
departure <- dp[,c(-1)]
departure <- ts(departure,start=c(2010,1),freq=12)
departure
plot(departure, col="black", main="Jumlah keberangkatan Penumpang Penerbangan
Domestik", xlab="waktu",
      sub="Januari 2010 sampai November 2021",type="l", ylab="Jumlah
keberangkatan",lty=1, lwd = 1.5)
# Triple Eksponential Smoothing
hw.add.dep <- HoltWinters(departure, seasonal="additive")
hw.add.dep
plot(hw.add.dep, main="Holt-Winter Model with Additive")
legend("topleft",c("Data Keberangkatan Aktual","Model Aditif"),
      col=c("black","2"),lty=1, cex=0.8, text.font=1)
hw.multi.dep <- HoltWinters(departure, seasonal="multiplicative")
hw.multi.dep
plot(hw.multi.dep, main="Holt-Winter Model with Multiplicative")
legend("topleft",c("Data keberangkatan Aktual","Model Multiplicative"),
      col=c("black","2"),lty=1, cex=0.8, text.font=1)
hw.add.dep$fitted
hw.multi.dep$fitted
# ukuran kesalahan
accuracy(hw.add.dep$fitted, departure)
accuracy(hw.multi.dep$fitted, departure)
# prediksi dengan model terbaik yaitu multiplicative
```

```

library(forecast)

forecasting.add.dep <- forecast(hw.add.dep, h=12, prediction.interval = TRUE,
                              level=0.95)

forecasting.add.dep

forecasting.multi.dep <- forecast(hw.multi.dep, h=12, prediction.interval = TRUE,
                                 level=0.95)

forecasting.multi.dep

# Plot Peramalan
plot(forecasting.add.dep, main="Peramalan Jumlah keberangkatan Penumpang
    Penerbangan Domestik",
     xlab="waktu", col="black", ylab="Jumlah Penumpang", lwd = 1.5)
lines(hw.add.dep$fitted[,1], col="red", lwd = 1.5,lty=5)
legend("topleft",legend=c("Data Aktual","model Aditif","Peramalan"),
      col=c("black","red","blue"), lty = 1, cex=0.8, inset=0.02, lwd = 2)

# Check Residual
acf(forecasting.add.dep$residuals, main="Residuals", lag.max=25, na.action = na.pass)
plot.ts(forecasting.add.dep$residuals, main="Plot Residuals", ylab="Residuals")
Box.test(forecasting.add.dep$residuals, lag=10, type="Ljung-Box")
hist(forecasting.add.dep$residuals)
lines(density(forecasting.add.dep$residuals), col=2)

```

Lampiran 58. R Codes Perbandingan Metode *Seasonal ARIMA* dan *Triple Exponential Smoothing Holt-Winters*

```

#membandingkan forecast Kedatangan
SARIMA<-fit.data.arr
HoltWinters<-hw.add.arr$fitted[,1]
forecastSARIMA<-forecasting.arr
forecastHoltWinter<-forecasting.add.arr
arrival %>% autoplot()+autolayer(SARIMA,lwd=.3,lty=5)+
  autolayer(HoltWinters, lwd = .3,lty=5)+
  autolayer(forecastSARIMA$mean)+autolayer(forecastHoltWinter$mean)

#membandingkan Forecast Keberangkatan
SARIMA<-fitted(overfit.d1)

```



```
HoltWinters<-hw.add.dep$fitted[,1]
forecastSARIMA<-forecasting.dep
forecastHoltWinter<-forecasting.add.dep
arrival %>% autoplot()+autolayer(SARIMA,lwd=.3,lty=5)+
  autolayer(HoltWinters, lwd = .3,lty=5)+
  autolayer(forecastSARIMA$mean)+autolayer(forecastHoltWinter$mean)
```

