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LAMPIRAN

Lampiran 1. Gambar Uji Metode SARIMA

Waktu	Data Aktual		Data Ramalan									
			1 Pekan Data Historis		2 Pekan Data Historis		1 Bulan Data Historis		3 Bulan Data Historis		11 Bulan Data historis	
	Kecepatan (m/s)	Arah (Derajat)	Kecepatan (m/s)	Arah (Derajat)	Kecepatan (m/s)	Arah (Derajat)	Kecepatan (m/s)	Arah (Derajat)	Kecepatan (m/s)	Arah (Derajat)	Kecepatan (m/s)	Arah (Derajat)
01/12/2015 00:00	4,34	288,8	3,13531	324,432	2,63675	240,535	3,62758	229,931	2,26131	283,768	2,8473	292,751
01/12/2015 01:00	4,01	278,7	4,17863	323,801	3,2837	267,688	5,77321	182,272	4,14548	243,993	2,16406	233,84
01/12/2015 02:00	3,59	266,7	5,88111	330,544	4,0973	254,061	8,10447	226,809	7,24794	280,378	0,26299	204,873
01/12/2015 03:00	4,46	241,3	7,08619	333,983	4,98764	255,79	9,85918	223,056	9,89264	287,123	1,22162	249,977
01/12/2015 04:00	6,88	243,1	6,52413	330,252	5,12793	266,959	10,9266	213,54	10,6957	231,6	6,95127	244,692
01/12/2015 05:00	5,98	252,9	8,24043	342,338	5,58426	257,429	11,35573	215,254	11,01138	243,839	9,64845	242,762
01/12/2015 06:00	6,27	275,4	6,75103	368,436	4,06596	264,072	9,87496	216,774	9,19209	247,508	8,20377	197,279
01/12/2015 07:00	6,31	276,7	7,98027	367,796	3,41466	266,325	8,57906	216,207	8,91688	249,234	7,9653	245,133
01/12/2015 08:00	6,91	266,6	5,21195	315,85	2,20075	270,811	7,31267	219,597	7,92794	255,993	8,10226	239,759
01/12/2015 09:00	7,09	275	5,58318	297,206	1,99149	274,047	6,49323	227,585	7,35464	310,671	10,30918	237,905
01/12/2015 10:00	7,24	272,6	6,98177	261,781	2,38172	275,889	6,48303	229,331	7,14042	306,434	10,1952	195,397
01/12/2015 11:00	7,29	284,8	8,61951	276,096	2,93232	264,291	6,74952	228,687	7,48486	300,786	10,41256	263,558
01/12/2015 12:00	7,45	300,7	9,4601	312,239	3,54893	275,631	6,3576	230,909	7,02099	309,83	11,45264	254,906
01/12/2015 13:00	6,92	310,3	9,55071	310,71	3,92692	275,211	6,50415	228,364	7,29596	314,753	13,28521	252,787
01/12/2015 14:00	7,34	315,2	9,25932	307,881	4,32784	271,304	6,54552	230,266	7,54271	228,941	13,66111	184,859
01/12/2015 15:00	7,94	316,4	7,67298	309,345	4,16738	270,546	6,2574	227,822	7,1892	239,597	13,79565	254,515
01/12/2015 16:00	7,09	320,3	5,57352	318,444	3,78653	282,119	5,66007	227,594	6,42301	238,764	12,44234	242,561
01/12/2015 17:00	6,59	315,4	4,15832	317,035	3,959	273,853	5,44903	228,808	5,98723	240,488	8,538	237,311
01/12/2015 18:00	5,47	319,6	4,57886	319,841	4,26796	261,167	4,80705	232,116	5,29248	246,325	3,16618	140,271
01/12/2015 19:00	4,45	319,4	4,88293	325,78	4,03009	264,834	3,80984	239,668	4,33429	334,839	-0,42149	236,285
01/12/2015 20:00	3,37	314,9	5,74991	327,584	3,87113	268,083	2,9943	241,616	3,67658	322,19	-0,66238	216,601
01/12/2015 21:00	2,53	315,2	5,75963	333,444	3,28445	270,521	2,71364	241,057	3,76209	314,588	-1,55395	203,259
01/12/2015 22:00	2,35	305	6,44137	324,853	3,21307	272,383	2,46331	243,226	3,93108	329,538	-0,6177	165,158
01/12/2015 23:00	3,05	306,1	4,98559	337,691	1,8987	280,408	1,12908	240,707	2,61246	336,36	-0,36045	288,8
02/12/2015 00:00	3,21	301,2	6,38317	335,951	3,28268	285,779	2,74609	242,647	4,54233	224,022	0,15047	265,853
02/12/2015 01:00	3,65	282	7,52741	309,843	4,4327	287,224	4,75038	240,215	6,26948	237,04	0,78254	249,514
02/12/2015 02:00	4,19	276,7	6,74402	283,595	4,13773	282,779	6,83178	240,005	7,43485	238,423	0,14683	202,809

02/12/2015 01:00	3,03	282	1,22141	309,843	4,4521	281,224	4,15058	240,213	0,20948	231,04	0,18234	249,514
02/12/2015 02:00	4,19	276,7	6,74402	283,595	4,13773	282,779	6,83178	240,005	7,43485	238,423	0,14683	202,809
02/12/2015 03:00	6,36	258,5	6,1457	303,14	3,48995	282,269	8,77485	241,241	9,39799	240,922	-0,78179	275,897
02/12/2015 04:00	9,5	267,9	6,9215	340,91	4,05164	293,904	9,89446	244,568	11,03042	249,39	-0,78168	266,864
02/12/2015 05:00	6,57	303,9	7,6168	304,334	4,84783	285,644	10,22988	252,139	10,97557	370,402	4,18279	263,241
02/12/2015 06:00	5,64	281,5	6,92809	290,954	5,00074	274,293	8,59214	254,108	9,48537	351,566	6,41493	210,114
02/12/2015 07:00	6,51	265,6	6,75186	289,702	4,07203	277,956	7,62972	253,568	8,04321	339,085	5,3124	287,426
02/12/2015 08:00	7,27	266,6	4,7027	288,122	2,62638	281,373	6,34712	255,757	6,93251	357,601	3,45692	277,537
02/12/2015 09:00	6,96	271,8	5,64795	281,735	2,34735	283,95	5,79672	253,258	6,59042	367,202	5,04513	273,507
02/12/2015 10:00	6,71	274,1	6,93857	256,657	3,12252	285,9	5,80984	255,217	6,35871	230,487	5,43329	219,724
02/12/2015 11:00	6,4	283,3	8,01187	268,658	3,58144	292,748	6,05986	252,806	6,12425	247,345	6,71626	304,963
02/12/2015 12:00	6,18	292,6	8,59622	277,381	3,73936	298,592	5,68392	252,615	5,82847	245,983	6,9861	293,257
02/12/2015 13:00	6,09	300,6	7,96639	278,374	3,47616	300,004	5,90667	253,871	6,21762	246,479	7,54965	288,176
02/12/2015 14:00	5,6	306,8	7,37756	259,578	2,98675	295,682	5,99747	257,218	6,62336	253,625	8,39188	227,988
02/12/2015 15:00	4,69	306,8	6,26564	283,262	2,48271	295,244	5,62923	264,809	6,68875	394,964	9,15942	315,66
02/12/2015 16:00	3,6	310	3,99493	260,71	1,57925	306,964	4,76487	266,797	6,26984	370,51	9,58159	302,921
02/12/2015 17:00	1,93	309,9	1,76912	273,949	0,89162	298,792	4,18512	266,277	5,74179	354,978	8,25628	296,798
02/12/2015 18:00	0,57	341,2	0,85444	211,08	0,58919	287,442	3,33044	268,486	4,73035	376,355	4,29064	237,187
02/12/2015 19:00	0,5	41,2	0,81902	234,377	0,45226	291,194	2,43523	266,007	3,87314	384,602	-0,87479	331,736
02/12/2015 20:00	1,03	306,6	-0,13375	232,676	0,20353	294,688	1,56167	267,986	2,55325	292,557	-4,35281	317,598
02/12/2015 21:00	1,74	299,8	-1,37172	256,704	-0,14627	297,344	1,28358	265,594	2,01388	307,067	-4,29811	310,08
02/12/2015 22:00	1,89	301,6	-1,9868	266,58	-0,69362	299,376	0,91547	265,423	1,17616	309,669	-5,51102	261,734
02/12/2015 23:00	1,55	301,1	-0,48897	324,841	-0,77087	306,388	-0,45511	266,699	-0,51821	313,117	-5,14894	356,582
MSE			3,89686199	2822,841775	7,052019374	2034,043681	4,090138601	4056,225157	5,002619778	4736,467833	17,2610457	5557,325111
RMSE			1,974047109	53,13042231	2,655563852	45,10037341	2,022409108	63,68850098	2,236653701	68,82200108	4,154641464	74,54746884
MAD			1,651603542	37,18672917	2,178057917	24,83351111	1,512677292	54,03139583	1,648238958	45,74810417	3,5575475	52,06502083
MAPE			46,5125934	21,52320817	43,51654875	19,89639588	50,52062274	28,00085559	67,18320759	30,5855794	115,6952145	30,04391582

Lampiran 2. Perbandingan ARIMA dan SARIMA

Pebandingan	ARIMA	SARIMA																																								
Data	<i>Stasioner</i>	<i>Stasioner</i>																																								
Uji kolerasi	<i>Cuma ACF dan PACF non seasasonal</i>	<i>ACF dan PACF Seasonal dan non seasasonal</i>																																								
NOTASI	ARIMA (1,1,2)	SARIMA[(1,1,0)(1,1,0)8]																																								
Ljung Box	<table border="1"> <thead> <tr> <th><u>Lag</u></th> <th><u>12</u></th> <th><u>24</u></th> <th><u>36</u></th> <th><u>48</u></th> </tr> </thead> <tbody> <tr> <td>Chi-Square</td> <td>11,70</td> <td>20,01</td> <td>*</td> <td>*</td> </tr> <tr> <td>DF</td> <td>8</td> <td>20</td> <td>*</td> <td>*</td> </tr> <tr> <td>P-Value</td> <td>0,165</td> <td>0,458</td> <td>*</td> <td>*</td> </tr> </tbody> </table>	<u>Lag</u>	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>	Chi-Square	11,70	20,01	*	*	DF	8	20	*	*	P-Value	0,165	0,458	*	*	<table border="1"> <thead> <tr> <th><u>Lag</u></th> <th><u>12</u></th> <th><u>24</u></th> <th><u>36</u></th> <th><u>48</u></th> </tr> </thead> <tbody> <tr> <td>Chi-Square</td> <td>20,61</td> <td>32,03</td> <td>32,66</td> <td>*</td> </tr> <tr> <td>DF</td> <td>8</td> <td>20</td> <td>32</td> <td>*</td> </tr> <tr> <td>P-Value</td> <td>0,008</td> <td>0,043</td> <td>0,434</td> <td>*</td> </tr> </tbody> </table>	<u>Lag</u>	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>	Chi-Square	20,61	32,03	32,66	*	DF	8	20	32	*	P-Value	0,008	0,043	0,434	*
<u>Lag</u>	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>																																						
Chi-Square	11,70	20,01	*	*																																						
DF	8	20	*	*																																						
P-Value	0,165	0,458	*	*																																						
<u>Lag</u>	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>																																						
Chi-Square	20,61	32,03	32,66	*																																						
DF	8	20	32	*																																						
P-Value	0,008	0,043	0,434	*																																						
Iterasi																																										

<u>Iteration</u>	<u>SSE</u>	<u>Parameters</u>				
0	27,9767	0,100	0,100	0,100	0,003	
1	27,1828	0,250	0,207	0,098	-0,005	
2	26,5698	0,400	0,318	0,108	-0,011	
3	26,1656	0,550	0,438	0,126	-0,011	
4	25,8898	0,700	0,571	0,146	-0,008	
5	25,5608	0,850	0,710	0,169	-0,004	
6	25,0156	0,866	0,705	0,217	-0,006	
7	24,8433	0,871	0,707	0,244	-0,007	
8	24,7392	0,862	0,684	0,255	-0,012	
9	24,7215	0,850	0,660	0,291	-0,009	
10	24,6740	0,846	0,637	0,297	-0,015	
11	24,6526	0,843	0,639	0,304	-0,012	
12	24,6522	0,836	0,630	0,305	-0,013	
13	24,6484	0,837	0,632	0,308	-0,012	
14	24,6484	0,836	0,631	0,306	-0,013	
15	24,6482	0,837	0,633	0,307	-0,012	
16	24,6479	0,837	0,632	0,306	-0,013	
17	24,6477	0,837	0,634	0,305	-0,012	
18	24,6473	0,837	0,633	0,305	-0,012	
19	24,6473	0,837	0,634	0,305	-0,012	
20	24,6473	0,837	0,634	0,305	-0,012	

<u>Iteration</u>	<u>SSE</u>	<u>Parameters</u>				
0	56,5606	0,100	0,100	0,100	0,017	
1	49,8647	0,093	-0,006	-0,050	-0,018	
2	44,3733	0,086	-0,104	-0,200	-0,048	
3	39,8893	0,077	-0,194	-0,350	-0,077	
4	36,3202	0,064	-0,276	-0,500	-0,105	
5	33,7318	0,050	-0,331	-0,650	-0,129	
6	31,6966	0,028	-0,346	-0,800	-0,152	
7	29,9882	-0,025	-0,406	-0,927	-0,190	
8	29,5915	-0,043	-0,460	-0,987	-0,200	
9	29,5903	-0,052	-0,460	-0,985	-0,202	
10	29,5900	-0,053	-0,468	-0,983	-0,203	
11	29,5869	-0,052	-0,468	-0,988	-0,203	
12	29,5869	-0,053	-0,468	-0,989	-0,203	
13	29,5869	-0,053	-0,468	-0,989	-0,204	
14	29,5869	-0,053	-0,468	-0,989	-0,204	

Koefisien										
	Type	Coef	SE Coef	T-Value	P-Value	Type	Coef	SE Coef	T-Value	P-Value
	AR 1	0,837	0,295	2,83	0,009	AR 1	-0,053	0,162	-0,33	0,746
	MA 1	0,634	0,377	1,68	0,107	SAR 8	-0,468	0,156	-3,01	0,004
	MA 2	0,305	0,218	1,40	0,175	SAR 16	-0,989	0,198	-4,99	0,000
	Constant	-0,0122	0,0302	-0,40	0,690	Constant	-0,204	0,121	-1,68	0,100
Residual	DF	SS	MS							
	23	24,6351	1,07109	DF	SS	MS				
				43	29,5764	0,687822				

Lampiran 3. Perbandingan Hasil Ramalan tanpa dan dengan pengelompokan

Waktu	Data Aktual		Data Ramalan			
			Tanpa Pengelompokan		Dengan Pengelompokan	
	Kecepatan (m/s)	Arah (Derajat)	Kecepatan (m/s)	Arah (Derajat)	Kecepatan (m/s)	Arah (Derajat)
08/05/2015 02:00	1,1	5	0,64944	13,2321041	1,59071	6,039
08/05/2015 05:00	1,5	335	1,49339	44,04773304	1,73701	301,358
08/05/2015 08:00	1,8	325	0,96001	282,2455662	1,8473	309,894
08/05/2015 11:00	2	225	1,06621	156,1557644	1,92745	317,611
08/05/2015 14:00	2,8	230	0,2747	227,6635019	1,34929	218,523
08/05/2015 17:00	2,6	225	0,02785	176,0901244	1,38559	273,292

08/05/2015 20:00	2,1	220	1,30372	254,012533	1,04872	246,694		
08/05/2015 23:00	0,7	195	0,70576	109,4059029	0,48816	288,517		
09/05/2015 02:00	0,3	330	0,59248	250,5810786	1,98236	324,645		
09/05/2015 05:00	1	50	0,05973	72,56225402	2,01612	88,166		
09/05/2015 08:00	1,9	90	0,8961	208,0731246	2,03219	82,514		
09/05/2015 11:00	3,4	105	1,50045	149,6751732	2,03342	76,862		
09/05/2015 14:00	3,8	85	1,48502	174,521194	3,68821	57,024		
09/05/2015 17:00	3	95	2,18944	153,0370649	4,62169	112,791		
09/05/2015 20:00	3,2	95	3,76208	209,5355878	3,21379	97,855		
09/05/2015 23:00	3,8	95	4,26738	78,07926889	4,00629	65,29		
MSE			1,721504	12035,15	0,75654	0,92682	1533,87	1861,31
RMSE			1,312061	109,7048	0,86979	0,96271	39,1647	43,1429
MAD			1,026353	92,40535	0,6306	0,73523	27,6929	32,6574
MAPE			48,79027	43,31699	97,0269	30,2126	23,7127	20,17