FIT3158 Note - W10 Forecast

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Calculate 4-period centred-moving average

Avg 再avg

		1997	1~/			
Time Period	Number of cars sold	4-Month Moving Average	4-Month Centred- Mo	4-Month Centred- Moving Average		
			Step 1	Step 2		
1	70	/				
2	80	4	Step 1. 由於4	period		
3	66	4	所以留4個slo	ts		
4	74					
5	64	72.50	Step 2. MA =	如此類推		
6	76	71.00				
7	72	70.00				
8	82	71.50				
9	82	73.50				
10	76	78.00				
11	84	78.00				
12	80	81.00				
13		80.50				
14						
			_			
(c)	MSE	40.59				

Time Period	Number of cars sold	4-Month Moving Average	4-Month Centred- Moving Average			
			Step 1	Step 2		
1	70					
2	80		72.50			
3	66		71.00	71.75		
4	74		70.00	70.50		
5	64	72.50	71.50	70.75		
6	76	71.00	73.50	72.50		
7	72	70.00	78.00	75.75		
8	82	71.50	78.00	78.00		
9	82	73.50	81.00	79.50		
10	76	78.00	80.50	80.75		
11	84	78.00				
12	80	81.00	100 01/0			
13		80.50	 move			
14						
(c)	MSE	40.59		20.25		

Time Period	Number of cars sold	4-Month Moving Average	4-Month Centred- Moving Average		
			Step 1	Step 2	
1	70				
2	80		72.50		
3	66		71.00	71.75	
4	74		70.00	70.50	
5	64	72.50	71.50	70.75	
6	76	71.00	73.50	72.50	
7	72	70.00	78.00	75.75	
8	82	71.50	78.00	78.00	
9	82	73.50	81.00	79.50	
10	76	78.00	80.50	80.75	
11	84	78.00		'	
12	80	81.00	Step 3. avg	2 values	
13		80.50	如此類推		
14		, in the second	ļ		
(c)	MSE	40.59		20.25	

Calculate MSE

		(a)	(a)
Time Period	Number of cars sold	4-Month Moving Average	
1	70		
2	80		
3	66		
4	74		Step 1. 揾error
5	64	72.50	e.g., 64 - 72.5
6	76	71.00	
7	72	70.00	
8	82	71.50	
9	82	73.50	
10	76	78.00	
11	84	78.00	
12	80	81.00	
13		80.50	
14]
(c)	MSE	40.59	1

diff	square	
8.5	72.25	
-5	25	
-2	2 4	Step 2. 將diff2
-10.5	110.25	
-8.5	72.25	
2	2 4	
-6	36	

diff	sc	uare		
8.5		72.25		
-5		25		
-2		4		
-10.5		110.25		
-8.5		72.25		
2		4		
-6		36		
1		1	Δνα	
			Avg	
	4	0.59375		

Calculate seasonal Deseasonalise data indices

I								(Deseasonali:
				Four-		(Seasonal Index)		
				Quarter	Centered	Original as a	(Scaled S _t)	Y _t ,S _t
			Actual	Moving	Moving	Percentage of	Seasonal	Seasonally
Year	Season	t	Sales, Y	Average	Average	Moving Average	Index	Adjusted
2013	Winter	1	3.9				94.60%	4.1
	Spring	2	6.1	6.28				
	Summer	3	4.3	7.25	6.76	63.59%	D20 (4.	3)/F20(6.76)
	Autumn	4	10.8	8.38	7.81	138.24%		
2014	Winter	5	7.8	9.03	8.70	89.66%	Γ .	
	Spring	6	10.6	9.70	9.36	113.22%	3	
	Summer	7	6.9	10.98	10.34	66.75%	i	
	Autumn	8	13.5	12.13	11.55	116.88%		
2015	Winter	9	12.9	12.98	12.55	102.79%	Γ.	
	Spring	10	15.2	14.28	13.63	111.56%		
	Summer	11	10.3	14.53	14.40	71.53%	i i	
	Autumn	12	18.7	14.33	14.43	129.64%		
2016	Winter	13	13.9	14.30	14.31	97.12%	Γ	
	Spring	14	14.4	13.95	14.13	101.95%		
	Summer	15	10.2	13.85	13.90	73.38%		
	Autumn	16	47.2	14.00	14 22	120 770/		

After calculating CMA

Quarter	F	Ratio	Index	
Winter	Α	94.45%	94.60%	A/B
Spring		109.72%	109.90%	
Summer		68.81%	68.92%	
Fall		126.38%	126.58%	
Average:	В	99.84%		

Step 1. 揾index

				Four-		(Seasonal Index)			_			
				Quarter	Centered	Original as a	(Sc	aled S _i)	Y _i S _i	Desea	sonalised	
			Actual	Moving	Moving	Percentage of	S	easonal	Seasonally			
Year	Season	t	Sales, Y.	Average	Average	Moving Average		Index	Adjusted			
2013	Winter	- 1	B 3.9				А	94.60%	(A/B) 4.1	Quarter	Ratio 94.45%	Index 94.60%
	Spring	2	6.1	6.28				109.90%	5.6	Spring	109.72%	109.90%
	Summer	3	4.3	7.25	6.76	63.59%		68.92%	6.2	Summer	68.81%	68.92%
	Autumn	4	10.8	8.38	7.81	138.24%		126.58%	8.5	Fall	126.38%	126.58%
2014	Winter	5	7.8	9.03	8.70	89.66%		94.60%	8.2	Average:	99.84%	
	Spring	6	10.6	9.70	9.36	113.22%		109,90%	9.6			
	Summer	7	6.9	10.98	10.34	66.75%		68.92%	10.0			
	Autumn	8	13.5	12.13	11.55	116.88%		126.58%	10.7			
2015	Winter	9	12.9	12.98	12.55	102.79%		94.60%	13.6			
	Spring	10	15.2	14.28	13.63	111.58%		109.90%	13.8			
	Summer	11	10.3	14.53	14.40	71.53%		68.92%	14.9			
	Autumn	12	18.7	14.33	14.43	129.64%		126,58%	14.8			
2016	Winter	13	13.9	14.30	14.31	97.12%		94.60%	14.7			
	Spring	14	14,4	13.95	14.13	101.95%		109.90%	13.1			

Step 2. 揾seasonal adjusted

Exponential

	Α	В	С	D	Е	F	
1	alpha =	0.1	$\hat{\mathbf{Y}}_{\cdot \cdot \cdot} = \alpha \mathbf{Y}$	$Y_t + (1 - \alpha)\hat{Y}_t$			
2			7 t+1 - W 7	t · (1 - \alpha) / t			
3	Week (t)	Sales (t)	forecast			'	
4	1	110.0	110.00			-	
5	2	115.0	110.00	=\$B\$1*B4+(1-\$B\$1)*	C4		
6	3	125.0	110.50	=\$B\$1*B5+(1-\$B\$1)*C	5		
7	4	120.0	111.95			'	'
8	5	125.0	112.76	_ 🗸 🔰		-	
9	6	120.0	113.98	Alpha * 上一個forecast v	/alue + (1 - /	Alpha) * 上一個exp	o value
10	7	130.0	114.58	_			
11	8	115.0	116.12	_			
12	9	110.0	116.01	_			
13	10	130.0	115.41	_			
				_			

MAPE

JUIGUUUI IUI	ajanu cj.					
	Α	В	С	D	Е	F
1	Time Period	Number of Toys Sold	Exponential Smoothing Prediction	Step		
2		真	測	APE	abs (測	- 真) / 真
3	1	174	174.00			-
4	2	189	174.00	0.079	abs (測 - =abs(17	
5	3	168	180.60	0.075	=15	
6	4	180	175.06	0.027	15/189	
7	5	165	177.23	0.074	= 0.079	865
8	6	183	171.85	0.061		
9	7	177	176.76	0.001		
10	8	192	176.86	0.079		
11	9	192	183.52	0.044		
12	10	183	187.25	0.023		
13	11	195	185.38	0.049		
14	12	189	189.61	0.003		
15						
16		MAPE		0.047		

1	A	В	С	D	E	F
1	Time Period	Number of Toys Sold	Exponential Smoothing Prediction			
2				APE		
3	1	174	174.00		alpha	0.44
4	2	189	174.00	0.079		
5	3	168	180.60	0.075	Х	
6	4	180	175.06	0.027	\dashv	
7	5	165	177.23	0.074	· /	
8	6	183	171.85	0.061	\/ /	
9	7	177	176.76	0.001	V	
10	8	192	176.86	0.079		
11	9	192	183.52	0.044		/
12	10	183	187.25	0.023		
13	11	195	185.38	0.049	7	
14	12	189	189.61	0.003	7	
15						
16		MAPE		0.047		