Carl von Ossietzky
Universität
Oldenburg

Forecasting Methods

Problem Set VI

Problem Set for Exercise 3

For feedback to your solutions of the problem set, please hand the R script file in by December 19th, 2025. Please send them by email to *abigail.asare@uol.de* with the subject "Forecasting: Problem Set VI".

Question 1

- If parameter $\alpha = 0.83$
- if the level $\ell_t = 510.31$ level
- calculate the following:

Year	time t	obs y_t	level ℓ_t	Forecast ŷ_t
2006	0		510.31	
2007	1	488.89		
2008	2	509.87		
2009	3	456.72		
2010	4	473.82		
2011	5	525.95		
2012	6	549.83		
2013	7	542.34		
	h			
2014	1			
2015	2			
2016	3			
2017	4			
2018	5			

Question 2

- If parameter $\alpha = 0.7$ and $\beta = 0.8$
- if ℓ_t = level and b_t = trend
- calculate the following:

time t	obs y_t	level ℓ_t	trend b_t	Forecast ŷ_t
0	-	148,112.60	436.57	-
1	160,217.99			
2	143,538.70			
3	148,158.37			
4	139,589.44			
5	147,395.12			
6	161,243.67			
h				
1				
2				
3				

Question 3

- If parameter $\alpha = 0.306$, $\beta = 0.0003$ and $\gamma = 0.426$
- if ℓ_t = level ,b_t = trend and s_t = additive seasonality
- calculate the following:

Year	Quarter	time t	obs y_t	level ℓ_t	trend b_t	season s_t	Forecast ŷ_t
2004	Q1	-3				9.70	
2004	Q2	-2				-9.31	
2004	Q3	-1				-1.69	
2004	Q4	0		32.26	0.70	1.31	
2005	Q1	1	42.21				
2005	Q2	2	24.65				
2005	Q3	3	32.67				
2005	Q4	5	37.26				
2006	Q1	6	73.26				
2006	Q2	7	47.70				
2006	Q3	8	61.10				
2006	Q4	9	66.06				
		h					
2007	Q1	1					
2007	Q2	2					
2007	Q3	3					
2007	Q4	4					
2008	Q1	5					
2008	Q2	6					
2008	Q3	7					
2008	Q4	8					

Question 4

- If parameter $\alpha = 0.0441$, $\beta = 0.030$ and $\gamma = 0.002$
- if ℓ_t = level ,b_t = trend and s_t = multiplicative seasonality
- calculate the following:

Year	Quarter	time t	obs y_t	level ℓ_t	trend b_t	season s_t	Forecast ŷ_t
2004	Q1	-3				1.24	
2004	Q2	-2				0.77	
2004	Q3	-1				0.96	
2004	Q4	0		32.26	0.70	1.02	
2005	Q1	1	42.21				
2005	Q2	2	24.65				
2005	Q3	3	32.67				
2005	Q4	5	37.26				
2006	Q1	6	73.26				
2006	Q2	7	47.70				
2006	Q3	8	61.10				
2006	Q4	9	66.06				
		h					
2007	Q1	1					
2007	Q2	2					
2007	Q3	3					
2007	Q4	4					
2008	Q1	5					
2008	Q2	6					
2008	Q3	7					
2008	Q4	8					