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CVG

NEC

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3. Cumulative Stock
4. Durable input (goods)

2. Cumulative

$$f(t+h) = \frac{\sum_{i=t-n+1}^t Z_i}{n} \quad (MA)$$

$$\phi_p(L^p)Z_{ti} = \theta_q(L^q)\varepsilon_i \quad (q, p)$$

$$S_t = \alpha z_{t-1} + (1-\alpha)S_{t-1} \quad 0 < \alpha < 1 \quad (Richardson, 2005)$$

$$S_t = \alpha z_t + (1-\alpha)S_{t-1} \quad (t=1, 2, K, n) \quad \alpha \quad (SBC)$$

(Natrella, (MSE) .2006)

(Richardson, .2005) (Godjarati, 1995) ARIMA (p, d, q)

$$S_t = \alpha z_t + (1-\alpha)(S_{t-1} + T_{t-1}) \quad 0 < \alpha < 1 \quad (Richardson, 2005)$$

$$T_t = \beta (S_t - S_{t-1}) + (1-\beta)T_{t-1} \quad 0 < \beta < 1 \quad (Richardson, 2005)$$

- 6. Sigel exponential smoothing method
- 7. Mean Square Error (MSE)
- 8. Double exponential smoothing method
- 9. Level of Data

- 1. Box and Pierce
- 2. White noise
- 3. Schwarz Bayesian Criterion
- 4. Moving Average
- 5. Exponential smoothing method

(MGN)

$\beta \quad \alpha$

(MSE)

(Tkacz, 2001)

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$k \quad z_t$

$$\begin{aligned} & e_{2,t} \quad e_{1,t} \\ & (s_t) \\ & () \quad () \end{aligned}$$

$$F_{n+k} = S_n + KT_n \quad ($$

(d_t)

$k \quad F_{n+k}$

$$s_t = e_{\gamma,t} + e_{\nu,t} \quad ($$

z_t

$$d_t = e_{\gamma,t} - e_{\nu,t} \quad ($$

ARMIA

MGN

(Diebold & Mariano,

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:1995)

ARIMA

$$MGN = \frac{\hat{\rho}_{sd}}{\sqrt{\frac{1-\hat{\rho}_{sd}}{T-1}}}$$

$T \quad d_t \quad s_t$

$\hat{\rho}_{sd}$

$t_{(T-1)}$

(RMSE)

MAE RMSE

(MPAE)

(MAE)

MGN

MPAE

;(Holden et al., 1990)

$$RMSE = \sqrt{\frac{1}{n} \sum_{t=1}^n e_t^2} \quad ($$

$$MAE = \frac{1}{n} \sum_{t=1}^n |e_t| \quad ($$

$$MPAE = \left(\frac{1}{n} \sum_{t=1}^n \left| \frac{e_t}{z_t} \right| \right) \times 100 \quad ($$

(FAO)

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RMSE

6. Morgan-Granger-Newbold (MGN)
7. Augmented Dickey–Fuller (ADF)

1. K steps a head forecasting
2. Root of Mean Square Error (RMSE)
3. Mean Absolute Error (MAE)
4. Mean Percent Absolute Error (MPAE)
5. Theil U Statistic

	MPAE	MAE	RMSE
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MPAE			
ARIMA			
() ARIMA			
MPAE	/	/	/
	/		
()			ARIMA
			ARMIA
/			ARIMA
			()
			ARIMA

MPAE(%)	MAE	RMSE
/		ARIMA (2, 2, 1)
/		ARIMA (2, 1, 2)
/		
/		
/		
/		ARIMA (3, 1, 3)

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MGN	MPAE(%)
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(Shabani, 2008; The Centre of Iran's
.Mechanization Dev.)

FAO

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.(FAO, 2008)

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