Bab. VI : Lampiran

Untuk mencari Rumus Slow Moving, Semi Fast Moving dan Fast Moving. didalam "Inventory Contrel" dengan metoda multiplikasi Lagrange adalah sebagai berikut.

I. Slow moving

St = 2 x (banyak barang per pesanan) - (kebutuhan per bulan).

$$St = 2X_i - \frac{Zi}{12}$$

$$n = \frac{12}{N} \quad \text{dimana } N = \frac{Zi}{Xi}$$

$$n = \frac{12\,Xi}{Zi}$$

$$T.C = C_r \sum \frac{Zi}{Xi} + Ct \sum \frac{XiCi}{2} + Cs \sum \left[Xi + St - (n-1)(\text{kebutuhan pra bulan})\right] Ci$$

$$T.C = 750 \sum \frac{Zi}{Xi} + 0{,}12 \sum \frac{XiCi}{2} + 0{,}10 \sum \left[Xi + (2Xi - \frac{Zi}{12}) - (\frac{12Xi}{Zi} - 1)(\frac{Zi}{12})\right] Ci$$

$$T.C = 750 \sum \frac{Zi}{Xi} + 0{,}26 \sum XiCi.$$

Pembatas

a). Alokasi dana $\leq \sum \frac{ZiCi}{4}$

$$g1 \equiv Xi\,Ci - 0{,}25\,Zi\,Ci. = 0$$

b). Kapasitas penyimpanan barang didalam gudang TAK ADA.

$$g2 \equiv 0$$

c). Jumlah bunga maximal yang harus dikembalikan $\leq 20\% \sum \frac{Zi\,Ci}{4}$

$$g3 = \sum \left[Xi + St - (n-1)(\text{kebutuhan pra bulan})(1+t)^{n-1}\right] - 20\% \sum \frac{Zi\,Ji}{4}$$

$$= \sum \left[Xi + 2Xi - \frac{Zi}{12} - (\frac{12Xi}{Zi} - 1)(\frac{Zi}{12})\right] \left\{(1{,}015)^3 + (1{,}015)^2 + (1{,}012) + 1\right\} - 0{,}05 \sum ZiCi.$$

$$\equiv -1{,}0909 \sum Xi + 0{,}2578 \sum Zi - 0{,}05 \sum ZiCi. \leq 0$$

Persamaan Lagrange

$$h = T.C + \lambda(g1 + g2 + g3)$$

$$= 750 \sum \frac{Zi}{Xi} + 0,26 \sum XiCi + \lambda \left[\sum XiCi - 0,25 \sum Zi\,Ci \right.$$

$$\left. -1,0909 \sum Xi + 0,25758 \sum Zi - 0,05 \sum Zi\,Ci \right]$$

$$\frac{\partial h}{\partial Xi} = - \frac{750\,Zi}{Xi^2} + 0,26Ci + \lambda (Ci - 1,0909)$$

$$\frac{\partial h}{\partial \lambda} = \sum XiCi - 0,3 \sum Zi\,Ci - 1,0909 \sum Xi + 0,25758 \sum Zi$$

: $\frac{\partial h}{\partial Xi} = 0$

$\frac{\partial h}{\partial \lambda} = 0$

maka $- \frac{750\,Zi}{Xi^2} + 0,26\,Ci + \lambda (Ci - 1,0909) = 0.$

$$X_i^2 = \frac{750\,Zi}{0,26\,Ci + \lambda (Ci - 1,0909)}$$

$$X_i = \sqrt{\frac{750\,Zi}{0,26\,Ci + \lambda (Ci - 1,0909)}}$$

$$\sum X_i (Ci - 1,0909) = 0,3 \sum Zi\,Ci - 0,25758 \sum Zi$$

$$\frac{750\,Zi\,(Ci - 1,0909)^2}{0,26\,Ci + \lambda (Ci - 1,0909)} = (0,3 \sum Zi\,Ci - 0,25758 \sum Zi)^2$$

$$\lambda = \frac{750\,(Ci - 1,0909)}{(0,3 \sum Ci - 0,25758)^2} - \frac{0,26\,Ci}{(Ci - 1,0909)}$$

II. Semi Fast moving dan Fast moving.

S_t = 2 x (banyak barang pra pesanan) - (lead time) (kebutuhan pra bulan)

$$s_t = 2X_i - \frac{Z_i}{24}$$

$$n = \frac{12Xi}{Z_i}$$

$$T.C = C_r \sum \frac{Z_i}{Xi} + Ct \sum \frac{XiCi}{2} + C_s \sum \left[Xi + S_t - (n-1)(\text{kebutuhan pra bulan}) \right] C_i$$

$$+ C_r \sum \left[X_i + S_t - (n-1)(\text{kebutuhan pra bulan}) \right] Ci$$

$$= 750 \sum \frac{Z_i}{Xi} + 0{,}12 \sum \frac{XiCi}{2} + 0{,}10 \sum \left[X_i + 2Xi - \frac{Z_i}{24} - \left(\frac{12Xi}{Z_i} - 1 \right)\left(\frac{Z_i}{12} \right) \right] Ci$$

$$+ 0{,}15 \sum \left[Xi + 2Xi - \frac{Z_i}{24} - \left(\frac{12Xi}{Z_i} - 1 \right)\left(\frac{Z_i}{12} \right) \right] C_i$$

$$T.C = 750 \sum \frac{Z_i}{Xi} + 0{,}56 \sum X_i C_i + 0{,}0104 \sum Z_i Ci.$$

Pembatas

a). Alokasi dana $\leqslant \sum \frac{Z_i Ci}{4}$

$$g_i = \sum XiCi - \sum \frac{Z_i Ci}{4}$$

b). Kapasitas penyimpanan barang didalam gudang $\leqslant$ 10.000 unit.

$g_2 = \sum$ 2 x [jumlah pesanan pra order - lead time (kebutuhan pra bulan)] - 10.000.

$$g_2 = \sum 2 \left[X_i - \tfrac{1}{2} \left(\frac{Z_i}{12} \right) \right] - 10.000.$$

$$g_2 = 2 \sum X_i - 0{,}08333 \sum Z_i - 10.000.$$

c). Jumlah bunga maximal yang harus dikembalikan $20\% \leqslant \sum \frac{Z_i Ci}{4}$

$$g_3 = \sum \left[X_i + S_t - (n-1)(\text{kebutuhan pra bulan})(1+t)^{n-1} \right] - 0{,}05 \sum Z_i Ci.$$

$$g_3 = 0{,}2991 \sum Z_i - 1{,}0909 \sum Xi - 0{,}05 \sum Z_i Ci.$$