

THE USE OF A SENSING FUNCTION IN STOCK CONTROL

IN CASES where a forecasting scheme is a modified simple E.W.M.A. using the tracking signal suggested by Trigg as a feedback to the smoothing constant, a modification to the re-order level formula is also readily available.

Let E_0 be the current smoothed error used in the computation of the tracking signal T_0 , and α_0 be the current value (function of tracking signal values) of the smoothing constant.

Consider:

$$H = 1 + \theta(\lambda \text{sign}(E_0) - 1) \alpha_0; \lambda, \theta \text{ finite.}$$

In the case of a constant mean level of demand the value of E_0 tends to zero. Thus α_0 tends to zero and H tends to unity.

In the case of rising demand T_0 and hence α_0 tend to unity, the sign (E_0) is positive and thus H tends to the value of $1 + \theta(\lambda - 1)$.

In the case of falling demand H tends to the value of $1 - \theta(\lambda + 1)$.

In the case of a changing mean level of demand the forecast will tend to lag and hence the recorder level based on a calculation of the type:

$$R = \text{demand} + \text{safety stock}$$

will tend to be too low when demand is rising and too high when it is falling, giving excessive stockouts and stocks respectively.

By a proper choice of θ and λ and hence range of values for H , the re-order level can be modified to improve the uniformity of stock levels and service over items and time. The suggested modification is:

$$R = \text{demand} + H \cdot \text{safety stock.}$$

Simulations suggest that a suitable system over a wide range of situations is as follows:

$$\alpha_0 = \frac{1}{2}(\alpha_{-1} + |T_0|); \alpha_{-1} \text{ being } \alpha_0 \text{ of the previous period.}$$
$$\theta = -\frac{1}{4}, \lambda = -7 \text{ giving } -\frac{1}{2} < H < 3.$$

The benefits vary with cases but simulations suggest that a situation which had 18 per cent of weeks with stocks unavailable could be reduced to 2 per cent with only a 10 per cent increase in average stock whilst a falling demand case could have a 30 per cent reduction in stock-holding without involvement of stockouts.

T. J. GASKELL

Paisley College of Technology

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