$$C_j = \frac{A + pD_j + rR_j + sS_j}{T_j} \tag{2}$$

The resulting model for C_j will have two continuous variables T_j and K_j. An approach similar to the iterative procedure suggested by Silver[3] can be adopted for determining the replenishment policy over the entire planning horizon. The policy resulting from such an approach will generally outperform (for $n > 1$) the policy obtained by following the approach suggested by Goswami and Chaudhuri[1].

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RESPONSE

The detailed analytical study of the economic replenishment policy for inventory items having a linear (positive) trend in demand was first made by Donaldson[1]. He dealt with a no-shortage inventory policy over a well-defined time-horizon H where the demand is supposed to cease. The problem there is to determine the optimal reorder times t_i ($i = 0, 1, \ldots, n - 1$) so that the total of replenishment and carrying costs over $(0, H)$ is minimized, and inventory is again zero at time $t_h = H$.

As observed by Donaldson[1], the assumption of zero-demand at $t_h = H$ is an artificial restriction which usually leads to forced shortening of the final scheduling period in the process of implementing the policy. Thus, the solution remains sub-optimal. We are fully aware of the fact that for inventories having a linear trend in demand, the economic replenishment policy always results in unequal order intervals. However, to avoid the artificial restriction referred to above, we divide H into n equal reorder intervals of duration T and then determine n and T in an optimal manner[2]. Our solution is optimal in the framework of the model formulated therein.

We appreciate the idea of comparing this solution with that for the model with unequal reorder intervals. However, Mr Goyal's suggestion to minimize the total cost per unit time, C_j, during the jth order interval and then to use the iterative procedure of Silver[3] will not serve the purpose on two counts. Firstly, it will yield approximate solutions, not optimal solutions. Secondly, it may be difficult to obtain an iterative formula for T_j because $\partial C_j/\partial T_j = 0$ and $\partial C_j/\partial K_j = 0$ will give transcendental equations involving exponential terms in θ and T_j. This difficulty arises due to incorporation of the deterioration factor into the model.

The only way to avoid this complication is to take approximations over θ and thus to get approximate solutions again. As we have understood, it is a formidable task to solve analytically the general problem of Donaldson[1] taking the deterioration factor into account.

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