Sheet 5 (Multi-Echelon Inventory Control Part 2)

Exercise 1: s

Consider a three-stage serial system with normally distributed demand (mean 50, standard deviation 20). All locations review inventory periodically (R=1) and face a non-stockout probability constraint of 90%. Inventory holding costs are 1, 2 and 5 for the respective locations from upstream to downstream. The lead times are L1=2 for the most upstream location and Li=1 for the other two locations.

a) What are candidate values for the safety stock coverage times?

b) Determine the optimal allocation.

Exercise 2:

Assume a two-stage serial supply chain with periodic control and normally distributed demand with mean 100 and standard deviation 40. The lead times for each stage are L=1. The backorder penalty is b=20, inventory holding costs are h_W=1, h_R=3.

a) Determine the optimal parameters of an echelon-order-up-to-policy.

b) How does the analysis change if a non-stockout probability of 95% has to be ensured?

Exercise 3:

A two-echelon serial systems reviews inventories continuously and places replenishment orders following an (S-1, S) policy at both locations. Customer demand is assumed to follow a Poisson-process with a mean of 5 customers per period. Unsatisfied demand is backordered, the penalty cost per unit and unit of time is b=20. Inventories at both locations are subject to inventory holding costs, 1 at the upper location and 3 at the downstream location. The lead times are equal to one for the upstream location (warehouse) and two periods for downstream location (retailer). Determine the optimal parameters S for each location following the METRIC-approach.