Abhimanyu Sah (A 20167406)
Devarshi Tharwala (A 20159739)

Project: Power of Two Policy

Summary

The case study given to us had demand for 24 retailers and 1 warehouse. The holding cost for all the facilities were provided alongside the X and Y coordinates for the facilities. Distance formula was used to calculate the distance between warehouse and retailers. From this the setup cost was found for each retailer which was given as ($ad_i + C$, where 'a' is \$0.32 per mile and C is \$150). The details of these costs and demand are provided in the attached Excel file.

To calculate the effective reorder interval, values of g_i, g^i, tau_i and tau^i were found based on the formulas provided and then base T_L was assumed to be 1(year) but since not all retailers are in group G, we started with T_L as 0.25 which gives T_0 as 2^0 $T_L = 0.25$, and then all retailers were group G, then $T_0 = 2^1 T_L = 0.5$, the cost increased and two retailers were in group E and 7 retailers were in group L. Furthermore, for $T_0 = 2^2 T_L = 1$ and $T_0 = 2^3 T_L = 2$, the cost kept on increasing, so we found the good solution was $T_0 = 0.5$.

Effective reorder interval and total cost

The effective reorder interval for all the retailer for T0=0.5 is shown in the excel sheet attached with this file. For T0 =0.5, our T0* is 0.438 years which is 159.67 days. So, by using power of two policy the cycle of whole system lies in between ($T^*/\sqrt{2}$, $\sqrt{2}*(T^*)$) which was found as **128 days**. Furthermore, the total cost associated with distribution was found to be \$22,472.8. This was for the above found values.

Improving the solution

For improving the solution, can obviously use smaller time scale such as hours and minutes to find the solution. It is found that smaller the base time (T_L) better solution can be found but in real life this may not be possible as it is not practical for all the retailers and the warehouse. Furthermore, using Excel Solver (GRG Non-Linear), T_0 was found to be 0.310 years which is approximately 113.15 days and the cost associated to this is \$22,170. We can clearly see that there is a saving of \$302.7 but this may not be practical to all the retailers or warehouses.

Please find the attached Excel file for all calculations and Excel Solver calculations.