

Analysis of Inventory System using SciLab

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Abstract

Inventory occupies the most tactical place in the model of working capital of any organization and its proper management is of great importance. In this paper, we have presented a model for inventory management system keeping in view various factors like arrival of goods, delivery cycle and order cycle. We have used the Scicos/Xcos toolbox of SciLab open access software to design the process of inventory system that can support the decision making process.

Keywords

Inventory system, SciLab simulation, order cycle, delivery cycle, decision making

Introduction

For business enterprises, current asset include inventory as one of the biggest components. In many organizations, inventory control poses a serious problem because a large portion of the working capital is blocked in inventories and hence cost of inventory determines the turnover of working capital [2] . Thus, controlling inventory efficiently can help in maximizing profits of the organization. Inventory refers to the stock of finished goods along with the raw material as well as unfinished or partly finished goods.

The basic goal of inventory management is to minimize the capital investment in inventory and to reduce the probability of interruption in the production process due to non-availability of raw material and spare parts. While shortage of inventory poses a problem to the organization, excessive inventory is an idle resource and this situation should be avoided. Thus it becomes important to plan and manage required amount of inventories by forecasting the demands [2] .

Inventory System Model

The process flow for inventory management is shown in Figure 1. Companies place great emphasis on inventory management. The users initiate requests for assets and the inventory of assets is controlled by the inventory controller or inventory control manager and he assures that the organization adheres to all asset guidelines. Inventories includes raw materials needed for production, spare parts, materials for packing, paper, plastic, coal and petroleum products, goods in progress and finished products either at the factory or stores. The role of financial management is to suggest and devise purchasing techniques that will help the organization in availing discounts. Repository consists of

hardware, software and fixed assets of the organization [2] . All these functions are managed and updated in reports to keep track of incoming and outgoing material.

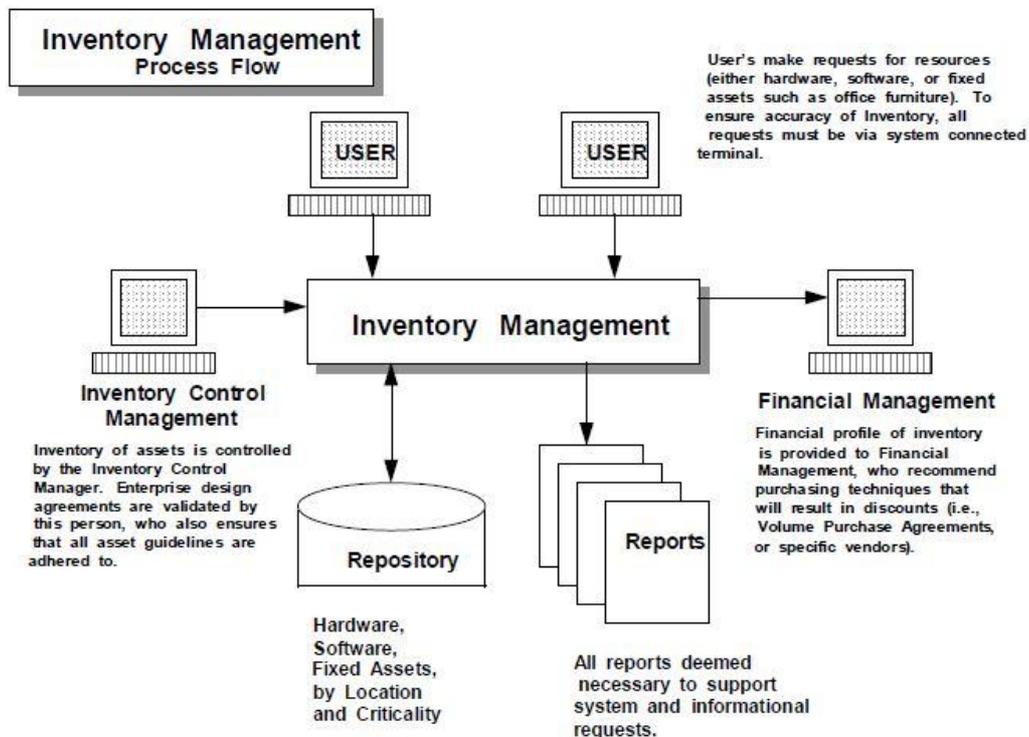


Figure 1: Inventory Management Process Flow

Simulation Model Using SciLab

Scicos/Xcos is a powerful toolbox in SciLab that can be used for modeling, simulation and analysis of practical dynamic system [3] . For the analysis of inventory management, we are using the blocks Random Generator (RAND_m) for delivery cycle, CONST for order cycle and expected inventory, other mathematical blocks such as PRODUCT, SUMMATION and general blocks like CLOCK_c, TIME_DELAY, MUX and CSCCOPE for generating the result in the Scicos library for making the inventory system model shown in Figure 2.

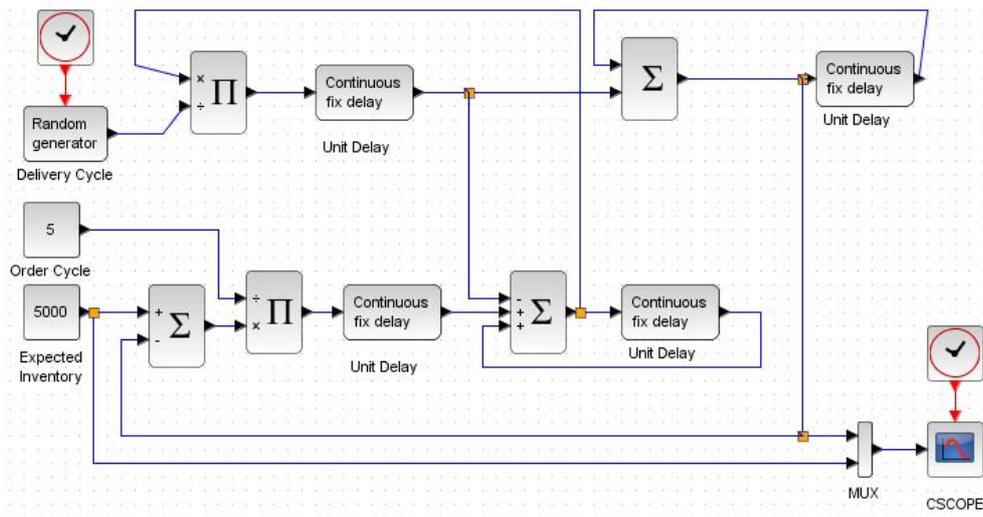


Figure 2: Inventory System Model in Scicos

The different parameters have been set on the basis of the requirements of an inventory management system. In our model, we have taken the value of order cycle as 5, expected inventory as 5000 and the mean and variance for the random generator representing delivery cycle are 5000 and 1600 respectively. Simulation time is 150.

Result

When we set the simulation time to 150, this means that the model is simulated for a time period of 150 weeks. We get the result shown in Figure 3 after simulation. From the result we can conclude that the actual inventory tends to fluctuate near the expected inventory volume but gradually comes close to the desired inventory volume. Less excess inventory leads to lower cost and hence if we select proper parameters, we can reduce the fluctuations and the system will stabilize faster. This is the task of decision makers to use different sets of parameters like order cycle and simulation time and find out the optimized cost of inventory by comparing the results [1].

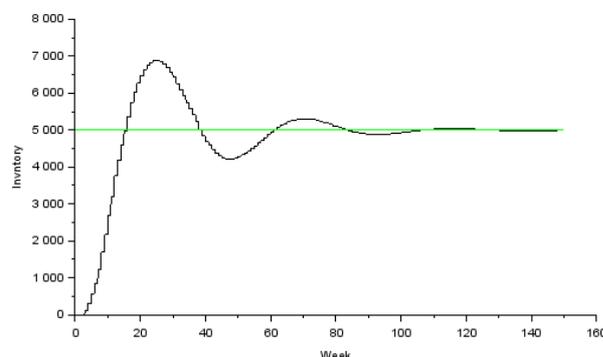


Figure 3: Graph of Inventory System.

Conclusion

Inventory management is a very important task for decision makers and they focus on avoiding excessive and inadequate inventory for smooth running of the organization [1]. The inventory system simulation and modeling shown in this paper using Scicos provides an efficient way for the decision makers to reach the best balance between too little and too much inventory [2], [3].

References

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