**Problem of minimizing the cost of the system with parallel machines**

(n=35) 35 different jobs in a workshop with two machine operators (m=2) at the beginning of the day, all of them are available without priority and delay relationship. The work speed of machines and operators are the same (parallel machines are the same), is assumed. Each job is processed only on one of the parallel machines and leaves the station, and no interruption in the processing of jobs is allowed. Each machine is able to perform all the activities related to a process alone and also can process only one piece at a time. It is assumed that the workshop starts from 9:00 am to 5:00 pm and the cost of overtime is 105 units per hour for each operator. Also, due to the special conditions of storage after preparation and before delivery, the storage cost for each work is Each hour of earliness is equal to 3 units.

The array of delay cost for each hour for each task is as follows:

The processing time of tasks have different distribution functions. 15 tasks have exponential distribution, 7 tasks have Erlang distribution, 8 tasks have uniform distribution and 5 tasks have Weibull distribution. The relevant parameters are given below:

In this part of the problem, the load and unload times are not addressed separately and they are all calculated with the distribution function (it is possible to convert the problem into a problem with a distribution function by considering the load time of the tasks with a different distribution function than the processing time of the tasks the problem transform into a phase-type Distribution problem.)

Finally, the deadline for the delivery of works is as follows:

The goal of the problem is to minimize the costs of system, which one of them is the cost of production, we can minimize that by minimizing completion time in a system which is the same as reducing the production time. In addition, by reducing the duration of lateness and earliness, the costs of the system can be reduced. Therefore, we intend to solve the cost minimization problem in the above system using two different approaches in three different sizes for the number of tasks (n) and machines (m) and compare the results and efficiency of the two algorithms with each other.