

Exercise 24 (22/12/98 ex..1)

Items are produced in batches of 3 in the production line at a manufacturing company. The production is continuously surveyed in a way such that every item in a batch is inspected for errors.

The company operates with the following manufacturing conditions also described as control levels

level 0 Normal.

level 1 Slightly enhanced inspection.

level 2 Enhanced inspection.

level 3 Inspection of all important parts in the production line.

If a batch is produced without errors the level of control is reduced by 1 if possible. If a batch is produced under normal conditions the level of control will be increased corresponding to the number of errors. If the batch is produced under other conditions the level of control will be increased with the number of errors exceeding one not exceeding the maximum level. The probability of j items with error under manufacturing conditions i is denoted by p_{ij} .

Question 1

Formulate a mathematical model describing the level of control based on the information above.

Question 2

Determine the long run fraction of batches produced under normal conditions.

Question 3

What is the expected number of batches of level 0-2 produced between two batches with the line fully inspected (level 3).

Whenever there is a change of the control strategy a cost is associated. Under normal conditions this can be expressed as c kr. for each unit with error. Under the other conditions there will be a fixed cost c_1 kr. associated with any change to a higher level while no change and change to lower levels is without cost.

Question 4

Determine the mean and variance of the cost associated with change of control level for a batch produced under normal conditions.

Question 5

Determine the expected cost pr. batch produced.