



FAKULTÄT FÜR
INFORMATIK

Lehrstuhl für Simulation

Applied Discrete Modelling

Assignment 5 “Quality Tester”: HMMs

System Specification

A quality tester is fed by material flows from two different sources. Only one of the two sources can be active, either *source 0* or *source 1*. The probability to switch from source 0 to source 1 in one step is 0.4. The one step transition probability from source 1 to source 0 is 0.3. At the beginning of the simulation source 0 is active.

In each time step one item is produced. The probability for the item to test OK is 0.9 for source 0 and 0.95 for source 1.

Implementation

Obtain or build a tool that is able to solve the Evaluation and Decoding problem for HMM. (e.g. MatLab, C, Excel...)

Tasks and Questions

Specify and draw the HMM representing the system.

Use your program to answer the following questions:

- What is the most likely sequence of wafer test results in the first three steps of our observation?
- What is the probability of testing three defective wafers in a row (trace: *defective, defective, defective*) in the first three steps of our observation?
- What is the probability of the trace (*defective, defective, defective*) when starting in steady state?
- What is the most likely path that led to testing three wafers OK in a row (trace: *OK, OK, OK*) in the first three steps of our observation?
- What is the most likely path for the trace (*OK, OK, OK*) when starting in steady state?