



Lehrstuhl für Simulation

Applied Discrete Modelling

Assignment 2 “Machine Temperature”: CTMCs

System Specification

A machine has two states. It can be either in *High Performance Mode* (HPM) or in *Low Performance Mode* (LPM). The average time spent in HPM is 50 minutes. The average time spent in LPM is 10 minutes.

At the beginning of the simulation the machine is in HPM. Assuming that the machine produces one part per time step, the probability to produce a working part in HPM is 0.95 in LPM only 0.8.

Implementation

Extend your DTMC solution program to discretize any CTMC using a given time step. The program should import CTMC specifications in the format given in the exercise.

Tasks and Questions

Specify and draw the CTMC representing the system.

Use your program to answer the following questions:

- What is the probability that the machine is in HPM after 8 minutes for different discretization time steps (e.g. 8, 4, 2, 1, 0.5)?
- What is the probability to be in HPM in steady state for different discretization time steps (e.g. 8, 4, 2, 1, 0.5)?
- What is the average probability of producing a working part in steady state?