EE618—Homework # 6

1. Problem 7.3.

2. Problem 7.4.

3. Problem 7.16.

4. Find an optimal policy and the corresponding cost for the following $\alpha-$discounted infinite horizon problem using the LP approach: $N$ identical tools need to be repeatedly assigned to $M$ identical jobs until either all jobs get done or all tools are broken. At the beginning, all tools are unbroken and all jobs are undone. Later, as tools are assigned to jobs, some tools may get broken and some jobs may get done. If a tool gets broken then it stays as broken, and if a job gets done it stays as done. If $n$ unbroken tools are assigned to an undone job at any time step, then, at the next time step, that job gets done with probability $1 - (1 - p^T)^n$ and one of the assigned tools gets broken with probability $p^J$ where $p^T$ is the probability that a single unbroken tool would get an undone job done. When an undone job gets done a reward $R$ is generated, and when an unbroken tool gets broken a cost $C$ is incurred. The objective is to maximize the expected total $\alpha-$discounted infinite horizon (reward-cost). Use the following numerical values:

\[
\alpha = 0.9, \quad N = M = 5, \quad p^T = 0.5, \quad p^J = 0.8, \quad R = 1.0, \quad C = 0.5.
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