IEOR 263A PS 8

Read Chapter 7 (skip 7.9 and 7.10). Chapter 6 Problems: 1, 6 (add d: Determine E[time to go from state 4 to 0] assuming $\lambda_i \equiv \lambda$, $\mu_i \equiv \mu$, and $\lambda < \mu$), 15, 20 (add d: Give the generator matrix and e: Give ν and P^* for the uniformized process). Chapter 7 problems: 2, 4, 8 (optional) 9, 10, 12. Also:

1. A single technician is responsible for two machines. For machine i, the time to fail $\sim \exp(\lambda_i)$ and the time to repair $\sim \exp(\mu_i)$, and all such times are independent. Suppose preemption is permitted without penalty, i.e., the technician can stop repairing one machine and switch to the other at any time. For $\lambda_1 = 1$, $\lambda_2 = 2$, $\mu_1 = 1$, $\mu_2 = 3$, find the optimal preemptive repair policy (which machine should have priority when both machines are down), when the objective is

   (a) Maximize the time both machines are working (a series system)

   (b) Minimize the time neither machine is working (a parallel system)

   (c) Maximize long-run average production rates, if machine i produces widgets at rate γ_i, $\gamma_1 = 2$, $\gamma_2 = 3$, and they operate independently.

2. If the mean value function of a renewal process $\{N(t)\}$ is given by $m(t) = t/2$, what is $P\{N(5) = 0\}$?