Computation Modeling Assignment 36

Cayden Lau

April 7, 2021

Problem 36-1

Solution Finding the piecewise function...

$$
\begin{aligned}
P(52, 30, 68, 7 \,|\, N) &= P(52) + P(30) + P(68) + P(7) \\
&= \frac{1}{N^4} \\
P_N(x) &= \begin{cases} \frac{1}{N^4} & N \geq 68 \\ 0 & \text{otherwise} \end{cases}
\end{aligned}
$$

Normalizing the likelihood to find the posterior distribution...

$$
\sum_{N=1}^{\infty} c \cdot P(N \,|\, 52, 30, 68, 7) = 1
$$

$$
c \cdot \sum_{N=1}^{\infty} \frac{1}{N^4} = 1
$$

$$
c \cdot \sum_{N=68}^{\infty} \frac{1}{N^4} = 1
$$

$$
0.000001084c = 1
$$

$$
c = 922741.866953715
$$

Using repl.it code to find the sums, with 95% certainty, the max number of tanks they have is 183.