Suggestions for Math 142 HW3.

1. Don't need to derive the differential equations (as I was trying to do on discussion).
   (a) Plot the histogram & function \( P_n(s) \).
   (b) Because one birth at most for \( t \rightarrow t+\Delta t \)
   (c) \( N = N + \text{Newborn} - \text{Nelddie} \)
       add code for \( \text{Nelddie} \)

2. (b) For \( n = 0, 1, 2, \ldots, N-1 \).

   \[ P_n(t+\Delta t) = \alpha_n P_n(t) + \nu_n \frac{P_{n+1}(t)}{P(t)} \]

   Referring to sec. 3b in textbook, we derive that
   \( \nu_n = (1 - \text{nat})^n \approx 1 - \text{nat} \).
   \( \tau_n = 1 - \nu_n \approx \text{nat} \) \hspace{1cm} (I skipped some steps on discussion).
   
   \( P_n(t+\Delta t) = P_n(t) \left( \frac{(1 + \nu_n) \text{nat}}{P(t)} \right) + (1 - \nu_n) P_n(t) \)

   \[ \frac{P_n(t+\Delta t) - P_n(t)}{\Delta t} = \ldots \] \hspace{1cm} and take limit \( \Delta t \rightarrow 0 \).

   \( P_n(t) \) is similar, but only one case.
   \( P_n(t+\Delta t) = \nu P(t) \).

   (c) Just take it as a continuous model.

   \[ \bar{N}(t+\Delta t) = (1 - \text{nat}) \bar{N}(t) \]