

Problem 1

$$a) S(t) + C(t) + H(t) = N$$

$$S(t) = N - C(t) - H(t)$$

$$\frac{dH}{dt} = \frac{\beta_H S(t) H(t)}{N} - \lambda_H H(t) - \delta_H H(t)$$

$$\frac{dH}{dt} = \frac{\beta_H (N - C(t) - H(t)) H(t)}{N} - (\lambda_H + \delta_H) H(t)$$

$$\frac{dH}{dt} = \frac{\beta_H}{N} (N - C(t) - H(t)) H(t) - (\lambda_H + \delta_H) H(t)$$

$$\frac{dC}{dt} = \frac{\beta_C S(t) C(t)}{N} - \lambda_C C(t) - \delta_C C(t)$$

$$\frac{dC}{dt} = \frac{\beta_C (N - C(t) - H(t)) C(t)}{N} - (\lambda_C + \delta_C) C(t)$$

$$\frac{dC}{dt} = \frac{\beta_C}{N} (N - C(t) - H(t)) C(t) - (\lambda_C + \delta_C) C(t)$$