

SEIR model Equations

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SEIR model considers three groups in the population:

- **Susceptible (S):** Person without immunity to the infectious agent, susceptible to be infected.
- **Infected (I):** Person infected. It can transmit the disease to susceptible if they are in contact with them.
- **Exposed (E):** Person that was in contact with an infected but it's in a latent phase where it does not spread the disease.
- **Recovered (R):** Person recovered, that have immunity. They don't spread the disease if they enter in contact with other person.

Total population it's equal to N (the sum of all this group).

$$N = S + I + R + E$$

$$\frac{dS}{dt} = -\beta \times \frac{S(t) \times I(t)}{N} \quad (1)$$

$$\frac{dE}{dt} = \beta \times \frac{S(t) \times I(t)}{N} - \frac{1}{\tau_e} \times E(t) \quad (2)$$

$$\frac{dI}{dt} = \frac{1}{\tau_e} \times E(t) - \frac{1}{\tau_I} \times I(t) \quad (3)$$

$$\frac{dR}{dt} = \frac{1}{\tau_i} \times I(t) \quad (4)$$