Mathematical Epidemiology - Preliminary Quiz

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Exercise 1

Consider the implicit equation,

$$f(z) = k \int_{T_1}^{T_2} e^{-zt} dt$$

and convince yourself that the four following properties of $f(z)$ are true:

1. $f(0) = k(T_2 - T_1)$.

2. $f(z)$ is a monotonically decreasing function.

3. $f(z) \longrightarrow \infty$ as $z \longrightarrow -\infty$.

4. $\lim_{z \to \infty} f(z) = 0$.

Exercise 2

Solve the following system of differential equations for all possible equilibrium solutions:

$$\frac{dS}{dt} = -\beta SI$$
$$\frac{dI}{dt} = \beta SI - \gamma I.$$

(Solutions not provided.)