BAB IV

KESIMPULAN

Berdasarkan pembahasan pada penelitian ini, dapat disimpulkan :

1. Model matematika tuberkulosis.

   Dalam sistem (3.1.1), diperoleh 2 titik ekuilibrium, yaitu titik ekuilibrium bebas tuberkulosis $E^0 = \left(S^0,\ E^0,\ I^0,\ R^0\right) = \left(\frac{\theta}{\mu}, 0, 0, 0\right)$, dan titik ekuilibrium endemik tuberkulosis $E^* = (S^*,\ E^*,\ I^*,\ R^*)$, dengan

$$
\begin{aligned}
S^* &= \frac{(\mu^2+\mu\gamma+\mu\delta+\epsilon\mu+\epsilon\gamma+\epsilon\delta)}{\beta\epsilon},\\
E^* &= \frac{-(\mu+\gamma+\delta)(\mu+k)(-\beta\theta\epsilon+\delta^2+\delta\mu\epsilon+\gamma\mu^2+\gamma\mu\epsilon+\mu^3+\mu^2\epsilon)}{\beta(\delta k\mu+\delta\mu^2+\delta\mu\epsilon+\gamma k\mu+\gamma k\epsilon+\gamma\mu^2+\gamma\mu\epsilon+k\mu^2+k\mu\epsilon+\mu^3+\mu^2\epsilon)\epsilon},\\
I^* &= \frac{-(\mu+k)(-\beta\theta\epsilon+\delta^2+\delta\mu\epsilon+\gamma\mu^2+\gamma\mu\epsilon+\mu^3+\mu^2\epsilon)}{\beta(\delta k\mu+\delta\mu^2+\delta\mu\epsilon+\gamma k\mu+\gamma k\epsilon+\gamma\mu^2+\gamma\mu\epsilon+k\mu^2+k\mu\epsilon+\mu^3+\mu^2\epsilon)},\\
R^* &= \frac{\delta(-\beta\theta\epsilon+\delta^2+\delta\mu\epsilon+\gamma\mu^2+\gamma\mu\epsilon+\mu^3+\mu^2\epsilon)}{-\beta(\delta k\mu+\delta\mu^2+\delta\mu\epsilon+\gamma k\mu+\gamma k\epsilon+\gamma\mu^2+\gamma\mu\epsilon+k\mu^2+k\mu\epsilon+\mu^3+\mu^2\epsilon)}.
\end{aligned}
$$

2. Kestabilan titik ekuilibrium model matematika tuberkulosis.

   Titik ekuilibrium bebas tuberkulosis stabil asimtotik jika:

   i. $R_0 < 1$,

   ii. $\lambda_1 = -\mu \Longrightarrow -\mu < 0$,

   iii. $\lambda_2 = -d \Longrightarrow -(\mu + k) < 0$,

   iv. $m_1 > 0$,

v. $m_1 m_2 > 0$.

Titik ekuilibrium endemik tuberkulosis stabil asimtotik jika:

i. $R_0 > 1$

ii. $l_1 > 0$

iii. $l_1 l_2 - l_3 > 0$

iv $l_3(l_1 l_2 - l_3) - l_1^2 l_4 > 0$

v. $l_4 > 0$