MCMS Problem Set

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Question 2 Continued

.) Finding the eigen values for the second equilibrium point Jacobian.

$$\begin{bmatrix} \beta(1-1/R_0)-\lambda & 0 \\ -\beta(1-1/R_0) & \lambda \end{bmatrix}$$

$$\rightarrow \lambda(\beta(1-1/R_0)-\lambda) = 0$$

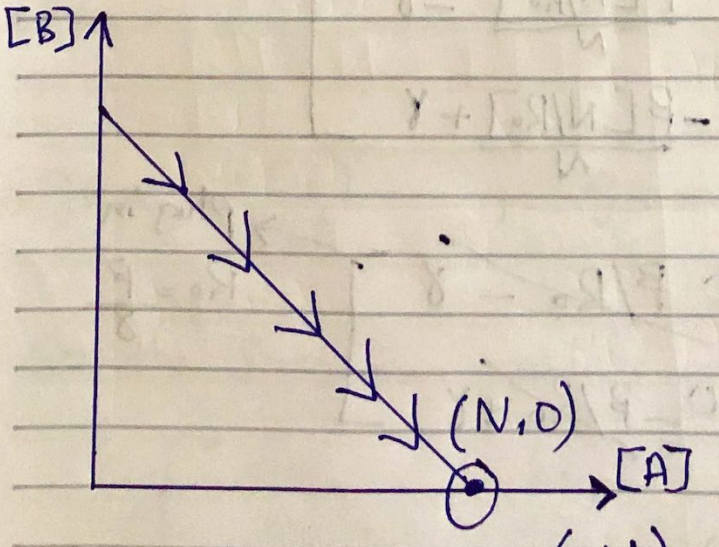
so $\lambda = 0$ or $\lambda = \beta(1-1/R_0)$

$1-1/R_0 < 0$ for stability to be achieved

which means, $\beta < \gamma$ to be stable

.) Plotting the Phase Portrait

1) for $(N,0)$ and if $\gamma < \beta$



2) for $(N/R_0, N-N/R_0)$ and if $\gamma > \beta$