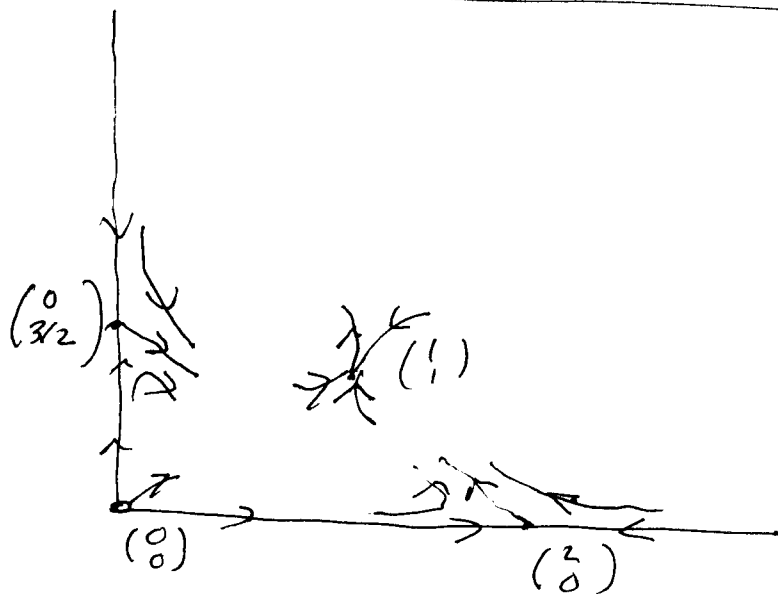


9. (CONT) *TL): $\vec{u}' = \begin{pmatrix} -1 & -1 \\ -1 & -2 \end{pmatrix} \vec{u}$

HAS EIGENVALS $\lambda_1 = -\frac{3+\sqrt{5}}{2} < 0$ AND $\lambda_2 = -\frac{3-\sqrt{5}}{2} < 0$

- \Rightarrow *TL) HAS A STABLE NODE AT $\begin{pmatrix} 0 \\ 0 \end{pmatrix}$
 THAT \Rightarrow *T) " " " " " "
 \Rightarrow *T) " " " " " $\begin{pmatrix} 1 \\ 1 \end{pmatrix}$

10. a)



b) $\begin{pmatrix} 1 \\ 1 \end{pmatrix}$ IS STABLE, THE OTHERS ARE UNSTABLE

c) LET $\vec{u}(0)$ BE "REASONABLY CLOSE" TO $\begin{pmatrix} 1 \\ 1 \end{pmatrix}$

\Rightarrow SINCE $\begin{pmatrix} 1 \\ 1 \end{pmatrix}$ IS ~~AN~~ AS. ST., STEADY-STATE POP SOLN IS $\begin{pmatrix} 1 \\ 1 \end{pmatrix}$.

IF $\vec{u}(0)$ NOT ON EITHER AXIS, ITS TRAJECTORY NEVER APPROACHES AN AXIS, SO THE MODEL DOES NOT PREDICT EXTINCTION FOR EITHER SPECIES.