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group 911

Lab test

1. periodic sol.: $\frac{-5}{89}\cos(x) + \frac{81}{89}\sin(x)$

   approximate values in $\pi/2$: $\begin{cases} \frac{81}{89} \approx 0.91 & \text{for the periodic sol.} \\ \frac{5}{89} \simeq 0,056 & \text{for its first order derivative} \end{cases}$

2. (picture attached)

3. determinant: 50

   eigenvalues: $-1+7i$ and $-1-7i$

   $$e^{tA} = \begin{pmatrix} e^{-t}\cos(7t) & -e^{t}\sin(7t) \\ e^{-t}\sin(7t) & e^{t}\cos(7t) \end{pmatrix}$$

   the system is a FOCUS and it is UNSTABLE

4. yes, $(0,0)$ is the unique equil. point; it is not a hyperbolic equilibrium point. (eigenvals.: $0, -48$, $\mathrm{Re}(0) = 0$)

5. fixed points: 1.36 and -0.36

   all the sequences of iterations end up being straight lines (the function converges into a certain point)