



8(a). The characteristic equation is given by

$$\begin{vmatrix} 1-r & -5 \\ 1 & -3-r \end{vmatrix} = (r+1)(r+0.25) = 0,$$

with roots $r_1 = -1$ and $r_2 = -0.25$. For $r = -1$, the components of the solution vector must satisfy $\xi_2 = 0$. Thus the corresponding eigenvector is $\xi^{(1)} = (1, 0)^T$. Substitution of $r = -0.25$ results in the single equation $0.75\xi_1 + \xi_2 = 0$. A corresponding eigenvector is $\xi^{(2)} = (4, -3)^T$.

(b). The eigenvalues are *real* and both *negative*. Hence the critical point is a *stable node*.

