

Companion Matrix

The *companion matrix* is given by:

$$C = \begin{bmatrix} 0 & 0 & \dots & 0 & -c_0 \\ 1 & 0 & \dots & 0 & -c_1 \\ 0 & 1 & \dots & 0 & -c_2 \\ \vdots & \vdots & \ddots & \vdots & \vdots \\ 0 & 0 & \dots & 1 & -c_{n-1} \end{bmatrix}$$

whose eigenvalues are the solutions to:

$$c_0 + c_1x + \dots + c_{n-1}x^{n-1} + x^n = 0$$