

## CIRCULANT MATRIX EIGENDECOMPOSITIONS

## Why

It happens that all circulant matrices have the same eigenvectors.

## **Definition**

Recall that C is circulant then

$$C = c_0 I + c_1 S + c_2 S^2 + \dots + c_{n-1} S^{n-1}.$$

So  $q \in \mathbf{R}^d$  is an eigenvector of C if and only if it is one of  $S^1$ 

 $<sup>^1\</sup>mathrm{Future}$  editions will complete this development.

