**Ex:** The following Matlab® code shows how to diagonalize a matrix $A$:

$$A = SAS^{-1}$$

where

- $S$ has eigenvectors as its columns
- $\Lambda$ is diagonal with eigenvalues on its diagonal

```matlab
syms a b c d
syms A S D
A = [a, b; c, d]
[V,D] = eig(A)
V = [(-1/2*a+1/2*d-1/2*(a^2-2*a*d+d^2+4*b*c)^(1/2))/c, (-1/2*a+1/2*d+1/2*(a^2-2*a*d+d^2+4*b*c)^(1/2))/c]
D = [1/2*a+1/2*d+1/2*(a^2-2*a*d+d^2+4*b*c)^(1/2), 1, 0]
[Vnum,Dnum] = eig(Anum)
Vnum = [1, -0.70711]
Dnum = [3, 0.70711, 0.70711]`