

Practice: Applying diagonalization to linear ODE's (Section 5.7)

- (1) Rewrite the ODE $y'' + y' - 2y = 0$ as a 2×2 linear system, $\mathbf{z}' = A\mathbf{z}$ using the substitution $z_1 = y$ and $z_2 = y'$.
- (2) Find a matrix S so that $S^{-1}AS = D$ is diagonal.
- (3) Let $\mathbf{w} = S^{-1}\mathbf{z}$, so that $\mathbf{w}' = D\mathbf{w}$. Solve for \mathbf{w} . (You may use that $w' = \lambda w$ has general solution $w(t) = Ke^{\lambda t}$.)
- (4) Solve for \mathbf{z} , then for y .