Solving Systems of Linear DEs by Elimination

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- **Systematic Elimination** may be used to solve a system of linear differential equations
- Ex. Rewrite the system $x'' + 2x' + y'' = x + 3y + \sin t$ (1)

$$\begin{aligned} x'' + 2x' + y'' &= x + 3y + \sin t \\ D^2x + 2Dx - x + D^2y - 3y & \\ (D^2 + 2D - 1)x + (D^2 - 3)y &= \sin t \end{aligned} \tag{1}$$

- A solution of a system of differential equations is a set of sufficiently differentiable functions, $x = \phi_1(t)$, $y = \phi_2(t)$, $z = \phi_3(t)$, and so on that satisfies each equation in the system on some common interval I