

Phase Portraits for Linear Systems of DE's

Math 3107 Differential Equations
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These problems will not be collected; they are for your practice. For each system of differential equations:

- find the eigenvalues and eigenvectors of the associated matrix,
- sketch lines in the direction of each eigenvector (unless complex), and
- sketch the associated phase portrait, showing representative solution curves with their orientation.

$$1. \quad \frac{dx}{dt} = -1x + 7y, \quad \frac{dy}{dt} = -3y$$

$$2. \quad \frac{dx}{dt} = 3x + 2y, \quad \frac{dy}{dt} = 2y$$

$$3. \quad \frac{dx}{dt} = x + 3y, \quad \frac{dy}{dt} = 3x + y$$

$$4. \quad \frac{dx}{dt} = 23x - 18y, \quad \frac{dy}{dt} = 32x - 25y$$

$$5. \quad \frac{dx}{dt} = 7x + 10y, \quad \frac{dy}{dt} = -4x - 5y$$

$$6. \quad \frac{dx}{dt} = 7x + 15y, \quad \frac{dy}{dt} = -6x - 11y$$

$$7. \quad \frac{dx}{dt} = 6x + 10y, \quad \frac{dy}{dt} = -4x - 6y$$