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differential equations: A geometrical approach.*

A second order implicit differential equation

$$R(x, y, \frac{dy}{dx}, \frac{d^2y}{dx^2}) = 0,$$

is an equation for which the second derivative can not be written as a single valued function of  $x, y$ , and the first derivative  $p = \frac{dy}{dx}$ . Such an equation defines a direction field in the space of 1-jets  $(x, y, p)$ , but existence and uniqueness of a direction at a point may not hold. Singularities can arise in a number of ways, and we examine the equation and its solution curves near the simplest of these singularities.

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