

Problem 2

In each of Problems 1 through 6, determine intervals in which solutions are sure to exist.

$$ty''' + (\sin t)y'' + 3y = \cos t$$

Solution

Divide both sides by t so that the coefficient of the highest derivative is 1.

$$y''' + \frac{\sin t}{t}y'' + \frac{3}{t}y = \frac{\cos t}{t}$$

A point of discontinuity is $t = 0$, so depending when the initial conditions are given, the solution to this ODE will be valid either for $-\infty < t < 0$ or $0 < t < \infty$.