

Variation of parameters

Find the general solution of each differential equation.

1. $y'' + y = \tan x$

2. $y'' + 9y = 2 \sec 3x$

3. $y'' - 2y' + y = \frac{e^x}{x}$

4. $y'' + 4y = \sin^2 x$

ANSWERS

1. $y(x) = C_1 \cos x + C_2 \sin x - \cos x \ln|\sec x + \tan x|$

2. $y(x) = C_1 \cos 3x + C_2 \sin 3x + \frac{2}{3}x \sin 3x + \frac{2}{9} \cos 3x \ln|\cos 3x|$

3. $y(x) = C_1 e^x + C_2 x e^x + x e^x \ln|x|$

4. $y(x) = C_1 \cos 2x + C_2 \sin 2x + \frac{1}{8} - \frac{1}{8}x \sin 2x$