MAT 1204 - DIFFERENTIAL EQUATION I

Assignment 2

Answer ALL questions and submit solutions for 1[i,iii,v]; 2[i,ii,iv], 3[i, ii, iv]; 4[i, ii, v,vi] on or bevore 22nd, May, 2023.

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1. Solve each of the following differential equations:
   i. $(D^2 - 8D + 15)\, y = 0$
   ii. $(D^2 + 4D + 5)\, y = 0$
   iii. $(D^8 + 6D^6 - 32D^2)\, y = 0$
   iv. $(D^4 - 4D^3 + 8D^2 - 8D + 4)\, y = 0$
   v. $(D^3 + D^2 + 4D + 4)\, y = 0$ if $y(0) = 0, y'(0) = 0, y''(0) = -5$.

2. Solve the following differential equations:
   i. $(D^2 + 6D + 9)\, y = 5e^{3x}$
   ii. $(D^2 - 6D + 9)\, y = 6e^{3x} + 7e^{-2x} - 2$
   iii. $(D^3 + 3D^2 + 3D + 1)\, y = e^{-x}$
   iv. $(D - 1)^3\, y = 16e^{3x}$
   v. $(D^2 - D - 6))\, y = e^x \cosh 2x$.

3. Solve the following differential equations:
   i. $(D^2 - 4D + 4)\, y = x^3 e^{2x}$
   ii. $(D^2 - 5D + 6)\, y = e^x \cos 2x$
   iii. $(D^2 + 5D + 6)\, y = e^{-2x} \sec^2 x\, (1 + \tan x)$
   iv. $(D^2 - 6D + 13)\, y = 8e^{3x} \sin 4x + 2^x$

4. Solve the following differential equation:
   i. $(D^2 + 2D + 1)\, y = 2x + x^2$
   ii. $(D^3 - 2D + 4)\, y = x^4 + 3x^2 - 5x + 2$
   iii. $(D^3 + 3D^2 + 2D)\, y = x^2$
   iv. $(D^2 - 2D + 1)\, y = x \sin x$
   v. $(D^2 - 2D + 1)\, y = xe^x \sin x$
   vi. $(D^2 + 9)\, y = \sec 3x$
   vii. $(D^3 + D^2 - D - 1)\, y = \cos 2x$