

Cálculo C - Lista 17

Transformada de Laplace (III):

Resolvendo EDO's usando a transformada de Laplace

Resolva o problema de valor inicial usando a transformada de Laplace inversa

1. $y'' + y' - 2y = 0$; $y(0) = 0$, $y'(0) = 2$
2. $y'' - 16y = e^{-2t}$; $y(0) = 1$, $y'(0) = 0$
3. $y'' + 2y' - 3y = te^t$; $y(0) = 0$, $y'(0) = 1$
4. $y' = y$; $y(0) = 1$
5. $y'' + 3y' + 2y = \cos 2t$; $y(0) = -1$, $y'(0) = 1$
6. $y'' + a^2y = 0$; $y(0) = 1$, $y'(0) = 0$
7. $y''' - y' = e^{3t}$; $y(0) = 0$, $y'(0) = 5$, $y''(0) = -2$
8. $y'' + 3y' - 4 \int_0^t y \, du = 0$; $y(0) = 2$, $y'(0) = 1$
9. $y'' + 9y = 0$; $y(0) = 0$; $y'(0) = 2$
10. $y'' + \omega^2y = 0$; $y(0) = A$, $y'(0) = B$, ($\omega \neq 0$)
11. $y'' - 2y' - 3y = 0$; $y(0) = 1$, $y'(0) = 7$
12. $4y'' + y = 0$; $y(0) = 1$, $y'(0) = -2$
13. $y'' - 4y' + 4y = 0$; $y(0) = 0$, $y'(0) = 2$
14. $y'' + 4y' + 4y = 0$; $y(0) = 2$, $y'(0) = -3$
15. $y'' + y' + 1.25y = 0$; $y(0) = 1$, $y'(0) = -0.5$

Lista 17 - Respostas

1. $-\frac{2}{3}e^t - \frac{2}{3}e^{-2t}$
2. $\frac{25}{48}e^{4t} + \frac{9}{16}e^{-4t} - \frac{1}{12}e^{-2t}$
3. $-\frac{17}{64}e^{-3t} + \frac{17}{64}e^t + \left(\frac{1}{8}t^2 - \frac{1}{16}t\right)e^t$
4. e^t
5. $-\frac{6}{5}e^{-t} + \frac{1}{4}e^{-2t} + \frac{3}{20}\sin 2t - \frac{1}{20}\cos 2t$ ✓
6. $\cos at$
7. $-\frac{19}{8}\cosh t + \frac{39}{8}\sinh t + \frac{7}{3} + \frac{1}{24}e^{3t}$
8. $e^t + e^{-2t} + 2te^{-2t}$
9. $\frac{2}{3}\sin 3t$
10. $A\cos \omega t + \frac{B}{\omega}\sin \omega t$
11. $e^{-t} + 2e^{3t}$
12. $\cos \frac{t}{2} - 4\sin \frac{t}{2}$
13. $2te^{2t}$
14. $(t+2)e^{-2t}$
15. $e^{-\frac{t}{2}}\cos t$