Plano de aula semanal: Semana 8

Matrícula	Aluno	Turma	professora
180115626	**Ana Aparecida Vieira da Silva**	**CC**	**Tatiane**

	Segunda-feira	**Terça-feira**	**Quinta-feira**
Data	**06/05**	**07/05**	**09/05**
Objetivos	**estudar para a prova do módulo 02**	**estudar para a prova do módulo 02**	**estudar para a prova do módulo 02**
Informação	**apresentação do aplicativo AprEnDO**		

Resumo			
Observação			
Dúvidas			
Monitoria	**Frequentei**	**Frequentei**	**Frequentei**

Portifólio semana 8 - dia 06 a 09/05

* 2 exemplos do uso do Método dos coef. indeterminados

ex. 1: $y'' - 3y' - 4y = 3e^{2t}$ (1)

$$X''(t) - 3X'(t) - 4X(t) = 3e^{2t} \rightarrow X(t) = Ae^{2t}$$

$$\rightarrow X'(t) = 2Ae^{2t}$$

$$\rightarrow X''(t) = 4Ae^{2t}$$

→ subst. na (1)

$$(4Ae^{2t}) - 3(2Ae^{2t}) - 4(Ae^{2t}) = 3e^{2t}$$

$$\cancel{4Ae^{2t}} - 6Ae^{2t} \cancel{- 4Ae^{2t}} = 3e^{2t}$$

$$-6Ae^{2t} = 3e^{2t}$$

$$A = \frac{-1}{2} \rightarrow X(T) = \frac{-1}{2}e^{2t}$$

ex. 2: $y'' - 3y' - 4y = 2\,\text{sen}(t)$

$$X''(t) - 3X'(t) - 4X = -2\,\text{sen}(t) \rightarrow X(T) = A.\text{sen}(t) + B\cos(t)$$

$$\rightarrow X' = A.\cos(T) - B.\text{sen}(T)$$

$$\rightarrow X''(t) = -A.\text{sen}(T) - B.\cos(T)$$

$$[-A.\text{sen}(T) - B.\cos(T)] - 3[A.\cos(T) - B\,\text{sen}(T)] - 4[A.\text{sen}(T) + B\cos(T)] = 2\,\text{sen}(T)$$

$$-A.\text{sen}(T) - B.\cos(T) - 3A\cos(T) + 3B\,\text{sen}(T) - 4A\,\text{sen}(T) - 4B\cos(T) = 2\,\text{sen}(t)$$

$$(-A + 3B - 4A)\text{sen}(T) + (-B - 3A - 4B).\cos(T) = 2\,\text{sen}(T)$$

- $(-A + 3B - 4A) = 2$

$$-5A + 3B = 2$$

$$\rightarrow -5.\frac{-5}{3}B + 3B = 2$$

$$B = \frac{3}{17}$$

- $(-B - 3A - 4B) = 0$

$$-5B - 3A = 0$$

$$A = \frac{-5}{3}B \rightarrow \frac{-5}{\cancel{3}} \cdot \frac{\cancel{3}}{17} = \frac{-5}{17}$$

$$X(T) = \frac{-5}{17}.\text{sen}(T) + \frac{3}{17}.\cos(T)$$

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* 2 exemplos do uso do método da variação de parâmetros

ex. 1: $y'' + 4y = 3\csc(T)$

eq. característica: $r^2 + 4 = 0$

raízes: $\frac{\pm\sqrt{0^2 - 4(1)(4)}}{2} = \boxed{\pm 2i}$

$$\rightarrow y = C_1.\cos 2t + C_2.\text{sen}\,2t$$

$$C_1 \rightarrow u_1(t) \qquad C_2 \rightarrow u_2(t)$$

$$y = u_1(t).\cos 2t + u_2(t).\text{sen}\,2t$$

$$\rightarrow y' = -2u_1(t)\text{sen}(2t) + 2u_2(t)\cos 2t + u_1'(t).\cos 2t + u_2'(t).\text{sen}\,2T$$

- $u_1'(t).\cos 2t + u_2'(t).\text{sen}\,2t = 0$

$$y' = -2u_1(t).\text{sen}\,2t + 2u_2(t).\cos 2t$$

$$y'' = -4u_1(t).\cos 2t - 4u_2(t).\text{sen}\,2t - 2u_1'(T).\text{sen}\,2T + 2u_2'(t)\cos$$

$\rightarrow$ substituindo na $y''+4y$

$$\left[-4v_1 \cdot \cos 2t - 4v_2 \cdot \operatorname{sen} t - 2v_1' \cdot \operatorname{sen} 2t + 2v_2' \cdot \cos 2t\right] + 4\left[v_1 \cdot \cos 2t + v_2 \cdot \operatorname{sen} 2t\right] = 3\csc t$$

$$\left[\cancel{-4v_1 \cdot \cos 2t} \cancel{- 4v_2 \operatorname{sen} t} - 2v_1' \cdot \operatorname{sen} 2t + 2v_2' \cdot \cos 2t \cancel{+ 4v_1 \cdot \cos 2t} \cancel{+ 4v_2 \cdot \operatorname{sen} 2t}\right] = 3\csc t$$

$$-2v_1' \cdot \operatorname{sen} 2t + 2v_2' \cdot \cos 2t = 3\csc t$$

exc 28 $y'' - 8y' + 16y = \dfrac{e^{4x}}{x^2} \rightarrow r^2 - 8r + 16 = 0 \rightarrow \dfrac{8 \pm \sqrt{(-8)^2 - 4(1)(16)}}{2} = 4$

$\hookrightarrow y(x) = C_1 \underbrace{e^{4x}}_{y_1} + C_2 \underbrace{x \cdot e^{4x}}_{y_2} \rightarrow y_p(x) = v_1(x) \cdot y_1(x) + v_2(x)\, y_2(x)$

$y_1' = 4e^{4x}$

$y_2' = e^{4x} + 4x \cdot e^{4x}$

$$\begin{cases} v_1'(x) \cdot y_1 + v_2'(x) \cdot y_2 = 0 = v_1' \cdot e^{4x} + v_2' \cdot x \cdot e^{4x} \\ v_1'(x) \cdot y_1' + v_2'(x) \cdot y_2' = \dfrac{e^{4x}}{x^2} = v_1' \cdot 4e^{4x} + v_2' \cdot (e^{4x} + 4x \cdot e^{4x}) \end{cases}$$

$$\begin{cases} v_1'(\cancel{e^{4x}}) + v_2'(x \cdot \cancel{e^{4x}}) = 0 \\ v_1'(4\cancel{e^{4x}}) + v_2'(\cancel{e^{4x}} + 4x \cdot \cancel{e^{4x}}) = \dfrac{e^{4x}}{x^2} \end{cases} \div e^{4x}$$

$$\begin{cases} v_1' + x \cdot v_2' = 0 \rightarrow v_1' = -x\, v_2' \rightarrow \boxed{v_1' = \dfrac{1}{x}} \\ 4v_1' + [1 + 4x] \cdot v_2' = \dfrac{1}{x^2} \end{cases}$$

integro

$\boxed{v_1 = -\ln|x|}$

$\cancel{4[-x \cdot v_2'] + [1 + 4x]} \cdot \boxed{v_2' = \dfrac{1}{x^2}}$

integro

$\boxed{v_2 = -\dfrac{1}{x}}$

$\rightarrow y_p(x) = -\ln|x| \cdot e^{4x} + \left(-\dfrac{1}{\cancel{x}}\right) \cdot \cancel{x} \cdot e^{4x}$

$y_p(x) = -\ln|x| \cdot e^{4x} - e^{4x}$

$y_p(x) = e^{4x}\left[-\ln|x| - 1\right]$

$\rightarrow y(x) = C_1 \cdot e^{4x} + C_2 \cdot x \cdot e^{4x} + e^{4x}\left[-\ln|x| - 1\right]$