Prova 04/11/21

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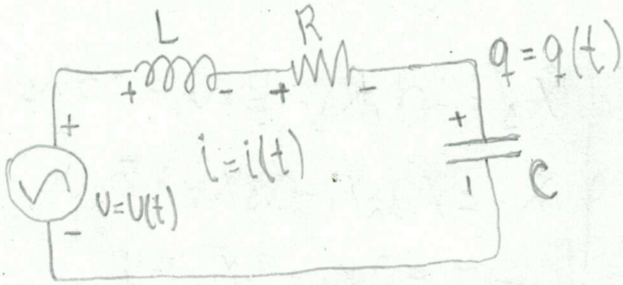
04)



a) $$-v(t) + L\int_0^t i\,dt + R_i + \frac{1}{c}\frac{di}{dt} = 0$$ é falso

Forma correta:

$$-U(t) + L\frac{di}{dt} + iR_i + \frac{1}{c}\int_0^t i\,dt = 0$$

$$\dot{x}_n = -a_n x_1 - a_{n-1} x_2 - \cdots - a_1 x + \beta_n u$$

01) $$\dddot{y} + 3\ddot{y} + 2\dot{y} = u$$

$$\dddot{y} + \overset{3}{a_1}\ddot{y} + \overset{2}{a_2}\dot{y} = \overset{0}{b_0}\dddot{u} + \overset{0}{b_1}\ddot{u} + \overset{0}{b_2}\dot{u} + \overset{1}{b_3}u \rightarrow \text{passo 1}$$

$$\begin{cases} \beta_0 = b_0 = 0 \\ \beta_1 = b_1 - \cancel{a_1\beta_0} = 0 \\ \beta_2 = b_2 - a_1\beta_1 - a_2\beta_2 = b_2 = 0 \\ \beta_3 = b_3 - a_1\beta_2 - a_2\beta_1 - a_1\beta_0 \end{cases}$$

$$\begin{cases} x_1 = y - \cancel{\beta_0 u} = y \\ x_2 = \dot{y} - \cancel{\beta_0\dot{u}} - \cancel{\beta_1 u} = \dot{y} \\ x_3 = \ddot{y} - \cancel{\beta_0\ddot{u}} - \cancel{\beta_1\dot{u}} - \cancel{\beta_2 u} = \ddot{y} \end{cases}$$

$$\begin{cases} \dot{x}_1 = \dot{y} = x_2 \\ \dot{x}_2 = \ddot{y} = x_3 \\ \dot{x}_3 = -a_3 x_1 - a_2 x_2 - a_1 x_3 + \beta_3 u = -2x_2 - 3x_3 + u \end{cases}$$

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} u \qquad y = \begin{bmatrix} 1 & 0 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$