

$$q = \begin{bmatrix} a(t) & x(t) & y(t) \end{bmatrix}$$

$$K = (m((c_y \dot{a}(t) \cos(a(t)) - x(t) + c_x \dot{a}(t) \sin(a(t)))(c_y \cos(a(t)) \dot{a}(t) - x(t) + c_x \sin(a(t)) \dot{a}(t)) + (y(t) + c_x \dot{a}(t) \cos(a(t)) - c_y \dot{a}(t) \sin(a(t)))(y(t) + c_x \cos(a(t)) \dot{a}(t) - c_y \sin(a(t)) \dot{a}(t))))/2 + (I \dot{a}(t) \dot{a}(t))/2$$

$$\frac{\partial K}{\partial q} = \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}$$

$$\frac{\partial K}{\partial \dot{q}} = \begin{pmatrix} I \dot{a}(t) - \frac{c_y m \cos(a(t)) x(t)}{2} + \frac{c_x m \cos(a(t)) y(t)}{2} - \frac{c_x m \sin(a(t)) x(t)}{2} - \frac{c_y m \sin(a(t)) y(t)}{2} + c_x^2 m \cos(a(t)) \dot{a}(t) + c_y^2 m \cos(a(t)) \dot{a}(t) - \frac{c_y m \cos(a(t)) x(t)}{2} + \frac{c_x m \cos(a(t)) y(t)}{2} - \frac{c_x m \sin(a(t)) x(t)}{2} \\ - \frac{m (c_y \cos(a(t)) \dot{a}(t) - 2 x(t) + c_x \sin(a(t)) \dot{a}(t) + c_y \cos(a(t)) \dot{a}(t) + c_x \sin(a(t)) \dot{a}(t))}{2} \\ \frac{m (2 y(t) + c_x \cos(a(t)) \dot{a}(t) - c_y \sin(a(t)) \dot{a}(t) + c_x \cos(a(t)) \dot{a}(t) - c_y \sin(a(t)) \dot{a}(t))}{2} \end{pmatrix}$$

$$\frac{\partial}{\partial t} \frac{\partial K}{\partial \dot{q}} = \begin{pmatrix} I \ddot{a}(t) - \frac{c_y m \cos(a(t)) x(t)}{2} + \frac{c_x m \cos(a(t)) y(t)}{2} - \frac{c_x m \sin(a(t)) x(t)}{2} - \frac{c_y m \sin(a(t)) y(t)}{2} - c_x^2 m \left| \dot{a}(t) \right|^2 \sin(a(t)) - c_y^2 m \left| \dot{a}(t) \right|^2 \sin(a(t)) - \frac{c_y m \cos(a(t)) x(t)}{2} + \frac{c_x m \cos(a(t)) y(t)}{2} \end{pmatrix}$$

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$$M(q) \begin{bmatrix} \ddot{a}(t) \\ \ddot{x}(t) \\ \ddot{y}(t) \end{bmatrix} = \begin{pmatrix} -I \ddot{a}(t) - \frac{m (2 c_x (y(t) + c_x \ddot{a}(t)) - 2 c_y (x(t) - c_y \ddot{a}(t)))}{2} \\ -m \left(x(t) - c_y \ddot{a}(t) \right) \\ -m \left(y(t) + c_x \ddot{a}(t) \right) \end{pmatrix}$$

$$C \begin{bmatrix} \dot{a}(t) \\ \dot{x}(t) \\ \dot{y}(t) \end{bmatrix} = \begin{pmatrix} \dot{a}(t) m \left(c_x x(t) + c_y y(t) \right) \\ c_x \dot{a}(t)^2 m \\ c_y \dot{a}(t)^2 m \end{pmatrix}$$

$$G = \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}$$

$$M(q) = \begin{bmatrix} -I - mc_x^2 + c_y^2 & -mc_y & mc_x \\ mc_y & -m & 0 \\ mc_x & 0 & -m \end{bmatrix}$$

$$B(q) = \begin{bmatrix} (l + c_x)R & (l - c_x)R \\ R \cos(a) & R \cos(a) \\ R \sin(a) & R \sin(a) \end{bmatrix}$$

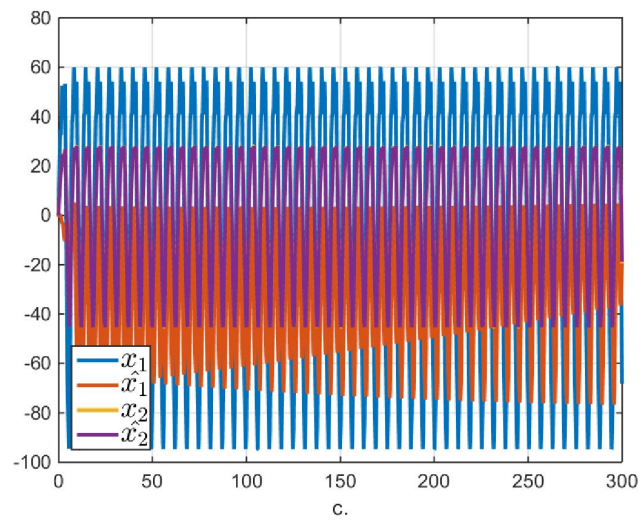


Рисунок 1 – Переменные состояния

Тест привет