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

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

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

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

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

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

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

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

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

$$C(q) = \begin{bmatrix} 0 & a\dot{(}t)c_x & a\dot{(}t)c_y \\ a\dot{(}t)c_x & 0 & 0 \\ a\dot{(}t)c_y & 0 & 0 \end{bmatrix}$$

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

$$A = \left(\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\mathrm{cx}\,\mathrm{dat}}{I+\mathrm{cy}^2\,m-\mathrm{cy}^2} & \frac{\mathrm{cy}\,\mathrm{dat}}{I+\mathrm{cy}^2\,m-\mathrm{cy}^2} \\ 0 & 0 & 0 & \frac{\mathrm{cx}\,\mathrm{dat}}{m} & \frac{\mathrm{cx}\,\mathrm{cy}\,\mathrm{dat}}{I+\mathrm{cy}^2\,m-\mathrm{cy}^2} & \frac{\mathrm{cy}^2\,\mathrm{dat}}{I+\mathrm{cy}^2\,m-\mathrm{cy}^2} \\ 0 & 0 & 0 & \frac{\mathrm{cy}\,\mathrm{dat}}{m} & \frac{\mathrm{cx}^2\,\mathrm{dat}}{I+\mathrm{cy}^2\,m-\mathrm{cy}^2} & \frac{\mathrm{cx}\,\mathrm{cy}\,\mathrm{dat}}{I+\mathrm{cy}^2\,m-\mathrm{cy}^2} \end{bmatrix} \right)$$

$$B = \left(\begin{array}{ccc} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ -\frac{1}{I+\mathrm{cy}^2\,m-\mathrm{cy}^2} & \frac{\mathrm{cy}}{I+\mathrm{cy}^2\,m-\mathrm{cy}^2} & -\frac{\mathrm{cx}}{I+\mathrm{cy}^2\,m-\mathrm{cy}^2} \\ -\frac{\mathrm{cy}}{I+\mathrm{cy}^2\,m-\mathrm{cy}^2} & -\frac{I-\mathrm{cy}^2}{m\,(I+\mathrm{cy}^2\,m-\mathrm{cy}^2)} & -\frac{\mathrm{cx}\,\mathrm{cy}}{I+\mathrm{cy}^2\,m-\mathrm{cy}^2} \\ -\frac{\mathrm{cx}}{I+\mathrm{cy}^2\,m-\mathrm{cy}^2} & \frac{\mathrm{cx}\,\mathrm{cy}}{I+\mathrm{cy}^2\,m-\mathrm{cy}^2} & -\frac{I+\mathrm{cx}^2\,m+\mathrm{cy}^2\,m-\mathrm{cy}^2}{m\,(I+\mathrm{cy}^2\,m-\mathrm{cy}^2)} \end{array} \right)$$

Тест привет

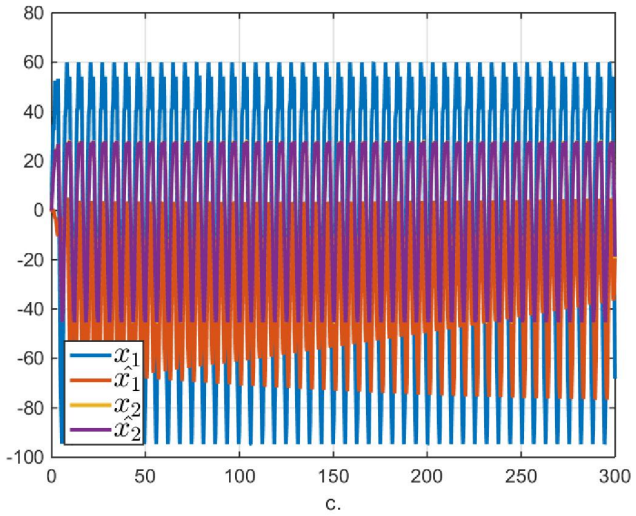

Рисунок 1 – Переменные состояния