

Slovenská Technická Univerzita – Fakulta elektrotechniky a informatiky  
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**B-RRM**

Zadanie č. 03

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## Úloha č. 1:

Výpočty:

$$t_0 = 0 \text{ s}$$

$$t_1 = 1 \text{ s}$$

$$t_f = 4 \text{ s}$$

$$q(t_0) = 0$$

$$\dot{q}(t_0) = 0$$

$$\ddot{q}(t_0) = 0$$

$$t_0 \rightarrow t_1 \quad q_3(t_0) = 0 \quad q_3(t_1) = 30$$

$$\dot{q}_3(t_0) = 0 \rightarrow \dot{q}_3(t_1) = 0$$

$$\ddot{q}_3(t_0) = 0 \quad \ddot{q}_3(t_1) = 0$$

$$q_3(t_0) = a_0 + a_1 t_0 + a_2 t_0^2 + a_3 t_0^3 + a_4 t_0^4 + a_5 t_0^5$$

$$\dot{q}_3(t_0) = 0 + a_1 + 2a_2 t_0 + 3a_3 t_0^2 + 4a_4 t_0^3 + 5a_5 t_0^4$$

$$\ddot{q}_3(t_0) = 0 + 0 + 2a_2 + 6a_3 t_0 + 12a_4 t_0^2 + 20a_5 t_0^3$$

$$\ddot{q}_3(t_0) = 0 + 0 + 0 + 6a_3 + 12a_4 t_0 + 20a_5 t_0^2$$

$$q(t_1) =$$

$$\dot{q}(t_1) =$$

$$\ddot{q}(t_1) =$$

$$q_3(t_f) = a_0 + a_1 t_f + a_2 t_f^2 + a_3 t_f^3 + a_4 t_f^4 + a_5 t_f^5$$

$$\dot{q}_3(t_f) = 0 + a_1 + 2a_2 t_f + 3a_3 t_f^2 + 4a_4 t_f^3 + 5a_5 t_f^4$$

$$\ddot{q}_3(t_f) = 0 + 0 + 2a_2 + 6a_3 t_f + 12a_4 t_f^2 + 20a_5 t_f^3$$

$$\begin{bmatrix} q \\ \dot{q} \\ \ddot{q} \end{bmatrix} = \begin{bmatrix} a_0 \\ a_1 \\ a_2 \\ a_3 \\ a_4 \\ a_5 \end{bmatrix} \times \begin{bmatrix} 1 & t_0 & t_0^2 & t_0^3 & t_0^4 & t_0^5 \\ 0 & 1 & 2t_0 & 3t_0^2 & 4t_0^3 & 5t_0^4 \\ 0 & 0 & 2 & 6t_0 & 12t_0^2 & 20t_0^3 \end{bmatrix}$$

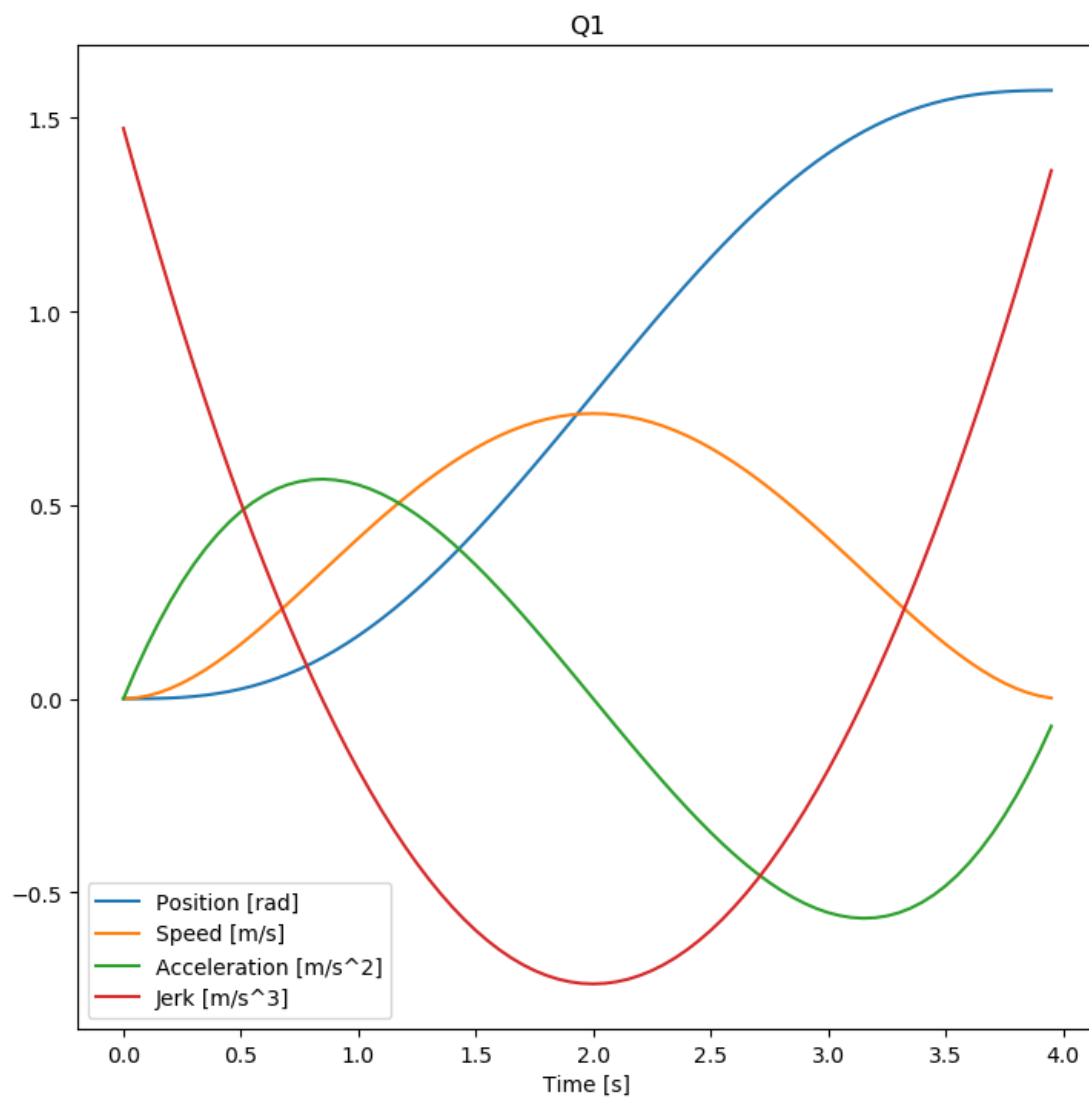
$$\begin{bmatrix} q_3 \\ \dot{q}_3 \\ \ddot{q}_3 \end{bmatrix} = \begin{bmatrix} a_0 \\ a_1 \\ a_2 \\ a_3 \\ a_4 \\ a_5 \end{bmatrix} \times \begin{bmatrix} 1 & t_f & t_f^2 & t_f^3 & t_f^4 & t_f^5 \\ 0 & 1 & 2t_f & 3t_f^2 & 4t_f^3 & 5t_f^4 \\ 0 & 0 & 2 & 6t_f & 12t_f^2 & 20t_f^3 \end{bmatrix}$$

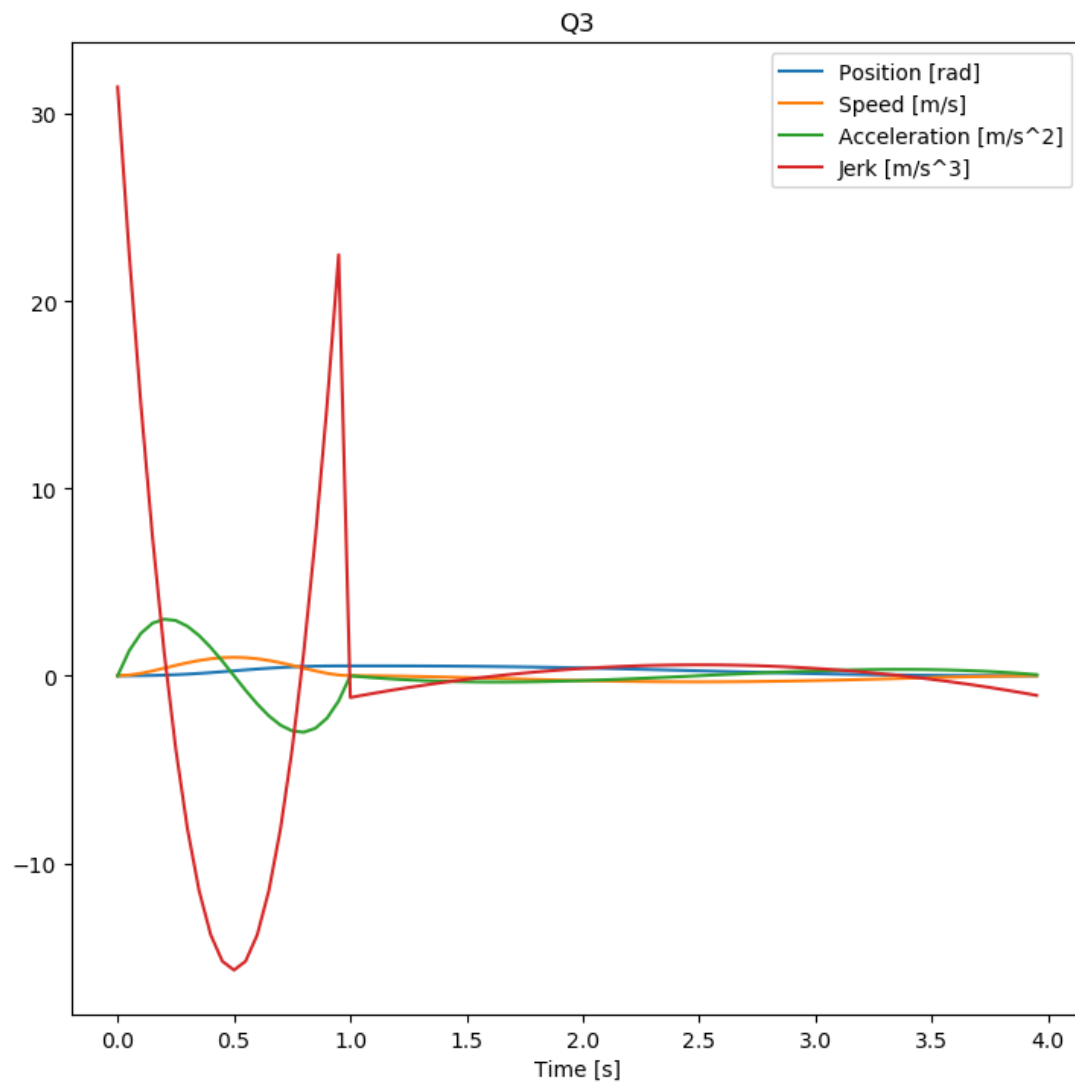
Pro 6 zadaných  
podmínek

$$\begin{bmatrix} q_3(t_0) \\ \dot{q}_3(t_0) \\ \ddot{q}_3(t_0) \\ q_3(t_f) \\ \dot{q}_3(t_f) \\ \ddot{q}_3(t_f) \end{bmatrix} = \begin{bmatrix} a_0 \\ a_1 \\ a_2 \\ a_3 \\ a_4 \\ a_5 \end{bmatrix} \begin{bmatrix} 1 & t_0 & t_0^2 & t_0^3 & t_0^4 & t_0^5 \\ 0 & 1 & 2t_0 & 3t_0^2 & 4t_0^3 & 5t_0^4 \\ 0 & 0 & 2 & 6t_0 & 12t_0^2 & 20t_0^3 \\ 1 & t_f & t_f^2 & t_f^3 & t_f^4 & t_f^5 \\ 0 & 1 & 2t_f & 3t_f^2 & 4t_f^3 & 5t_f^4 \\ 0 & 0 & 2 & 6t_f & 12t_f^2 & 20t_f^3 \end{bmatrix}$$

$$\bar{a} = \bar{q} \cdot M^{-1}$$

Graf priebehov jednotlivých veličín pre Q1 a Q3





Úloha č. 2:

Grafy:

