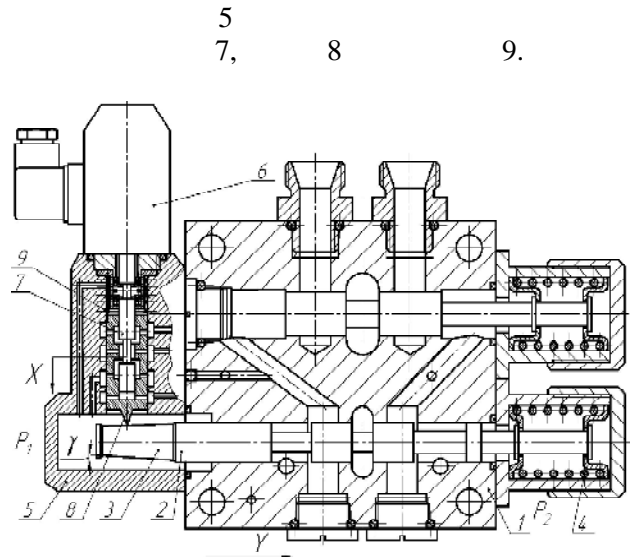


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*In the article there are the conducted researches of descriptions of the control system of proportional directional control valve with the electro-hydraulic management. Nonlinear properties of the control system, which show up both in static and in dynamic office hours, are exposed substantially.*

*Represented results of researches of influencing of application of sensor of reverse signal (SoRS) and influencing of structural parameters on descriptions of the control system.*



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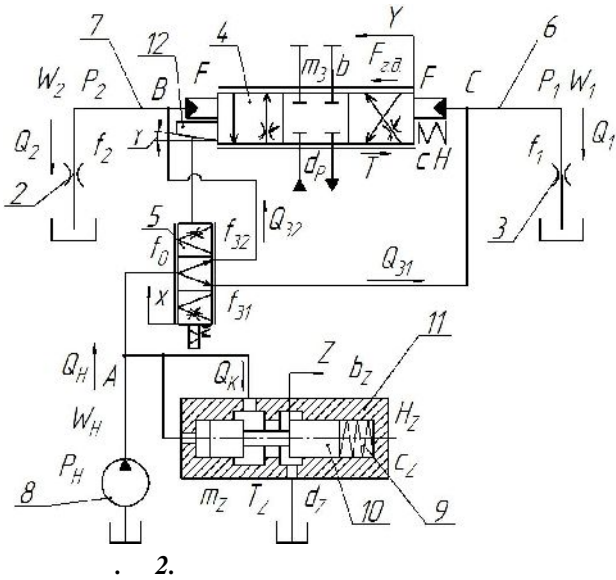
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$$f_{31} = \mu \cdot \pi \cdot d_3 \cdot x \cdot \sin \alpha + f_0,$$



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$$\begin{aligned} & \mu \cdot \pi \cdot d_Z \cdot (z_0 - z) \cdot \sin \beta_Z \cdot \sqrt{\frac{2 \cdot | \quad - \quad |}{\rho}} = \\ & [\mu \cdot \pi \cdot d_3 \cdot (x - y \cdot \operatorname{tg} \gamma) \cdot \sin \alpha + f_0] \times \\ & \times \sqrt{\frac{2 \cdot | \quad - \quad 1 |}{\rho}} \cdot \operatorname{sign}(\quad - \quad 1) + \\ & + [-d_3 \cdot \mu \cdot \pi \cdot (x - y \cdot \operatorname{tg} \gamma) \cdot \sin \alpha + f_0] \times \\ & \times \sqrt{\frac{2 \cdot | \quad - \quad 2 |}{\rho}} \cdot \operatorname{sign}(\quad - \quad 2) + \beta \cdot W_H \cdot \frac{d}{dt}; \\ & [\mu \cdot \pi \cdot d_3 \cdot (x - y \cdot \operatorname{tg} \gamma) \cdot \sin \alpha + f_0] \cdot \sqrt{\frac{2 \cdot | \quad - \quad 1 |}{\rho}} \times \\ & \times \operatorname{sign}(\quad - \quad 1) = \mu \cdot f_1 \cdot \sqrt{\frac{2 \cdot | \quad - \quad 1 |}{\rho}} + \beta \cdot W_1 \cdot \frac{d}{dt}; \end{aligned}$$

$$\begin{aligned} & [-d_3 \cdot \mu \cdot \pi \cdot (x - y \cdot \operatorname{tg} \gamma) \cdot \sin \alpha + f_0] \cdot \sqrt{\frac{2 \cdot | \quad - \quad 2 |}{\rho}} \times \\ & \times \operatorname{sign}(\quad - \quad 2) = \mu \cdot f_2 \cdot \sqrt{\frac{2 \cdot | \quad - \quad 2 |}{\rho}} + \beta \cdot W_2 \cdot \frac{d}{dt}; \\ & m_3 \frac{dV_y}{dt} = \quad 1 \cdot F - \quad 2 \cdot F - c \cdot (H + y) - b \frac{dy}{dt} - \\ & - T \cdot \operatorname{sign} \frac{dy}{dt} - d_3 \cdot \mu \cdot \pi \cdot y \cdot \sqrt{\frac{2 \cdot \Delta}{\rho}} \cdot 0.324 \cdot \sqrt{\Delta}; \\ & m_Z \frac{dV_Z}{dt} = \quad \cdot \frac{\pi \cdot d_Z^2}{4} - c_Z \cdot (H_Z + z) - \\ & - b_Z \frac{dz}{dt} - T_Z \cdot \operatorname{sign} \frac{dz}{dt} - d_Z \cdot \pi \cdot (z_0 - z) \cdot \sin \beta_Z \times \\ & \times \sqrt{\frac{2 \cdot (p \quad - \quad )}{\rho}} \cdot 0.324 \cdot \sqrt{(\quad - \quad )}. \end{aligned}$$

Q<sub>H</sub> - 1, - 6 ( . 2),  
 2 - 7, f<sub>1</sub> -  
 3, f<sub>2</sub> -  
 2, f<sub>0</sub> -  
 4 5 (2), W<sub>1</sub> - ,  
 , W<sub>2</sub> - , F -  
 3 ( . 2), -  
 4, - 4  
 ( . 2), m<sub>3</sub> - 3, b -  
 , 3, b<sub>Z</sub> -  
 ,  
 10, d<sub>p</sub> - 3, d<sub>Z</sub> -  
 10, d -  
 7, y -  
 3 ( . 2), x -  
 7 ( . 1), T - ,  
 1, z - 9,  
 z - 9, m<sub>Z</sub> -  
 10, T<sub>Z</sub> - ,  
 10, z<sub>0</sub> -  
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 12 1, -  
 5, ρ -  
 , μ - , β - ,

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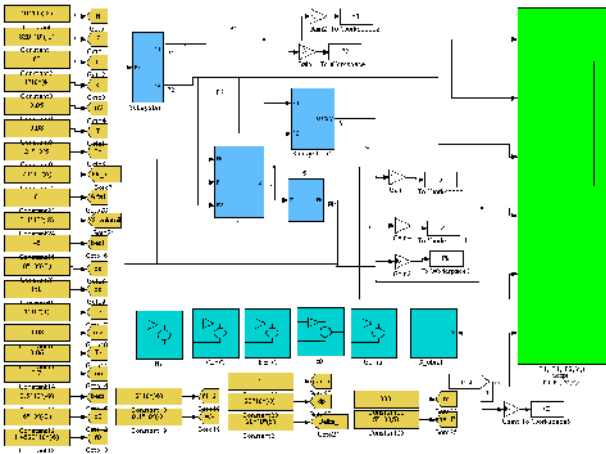
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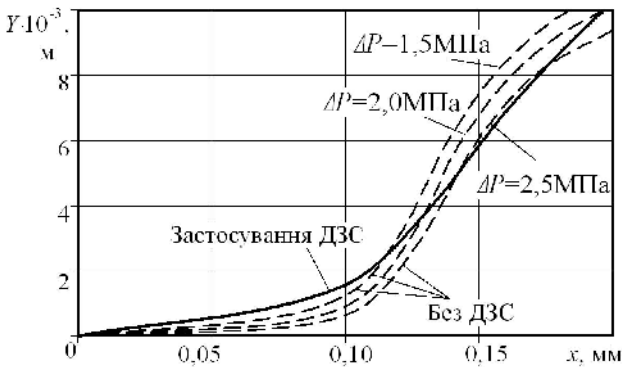
$$\begin{aligned} u_1(0) &= 20 \cdot 10^5, & u_2(0) &= 10 \cdot 10^5, \\ u_3(0) &= 10 \cdot 10^5, & y(0) &= 0, \\ x(0) &= 0.3 \cdot 10^{-3}, \end{aligned}$$

$$= 0.3 \cdot 10^{-3}$$

$$\begin{aligned} &: d_3 = 6 \cdot 10^{-3}; f_0 = 2 \cdot 10^{-6}; f_1 = 1 \cdot 10^{-6}; \\ f_2 &= 1 \cdot 10^{-6}; = 0,5 \cdot 10^9; = 900; \\ W_1 &= 0,3 \cdot 10^{-3}; W_H = 1 \cdot 10^{-3}; \mu = 0.7; c = 1 \cdot 10^4 \\ H/ &; H = 10 \cdot 10^{-3}; Q_H = 1 \cdot 10^{-3}/c \end{aligned}$$



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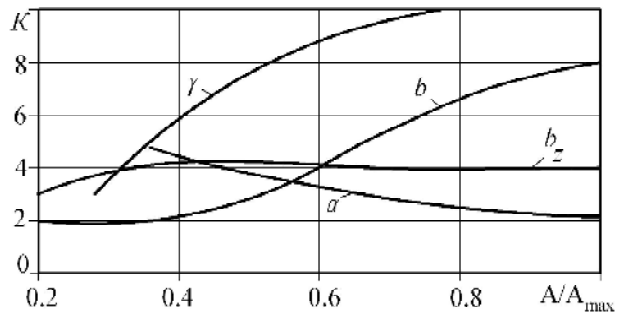
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— b b<sub>z</sub>

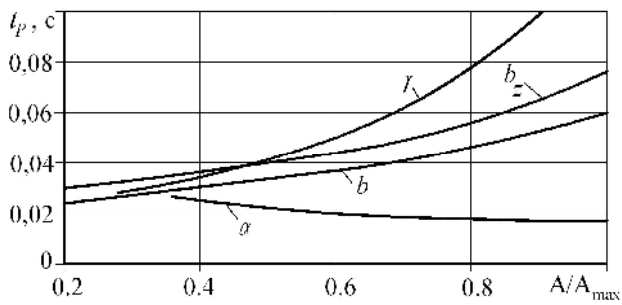
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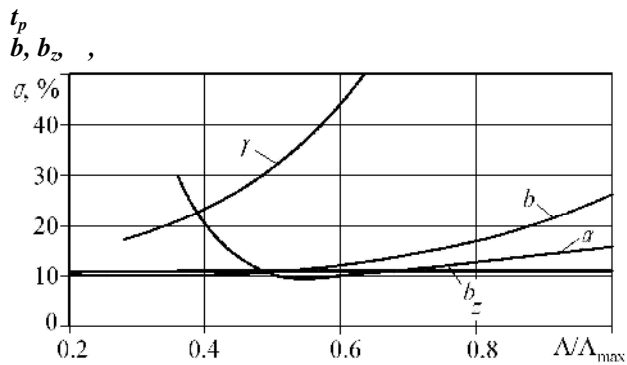


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b, b<sub>z</sub>,



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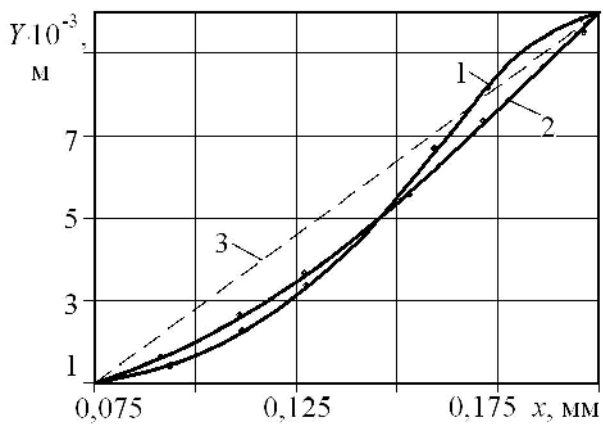
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$b, b_z, \sigma$

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 -  $=2..4^\circ$ ,  
 -  $=10..15^\circ$ ,

$b=15..35 /$

$b_z=150..200 /$

**C**

1. Bin Mu, System modelling, identification and coordinated control design for an articulated forestry machine – Thesis for the degree of Master of Engineering McGill University, – 1996, 117 .

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 4. . . . . Simulink:

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