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PARAMETERS OPTIMIZATION OF AC STABILIZER ON PRINCIPLE OF INDUCTION LEVITATION

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CALCULATION OF SECTIONAL EXCITATI ON WINDING

$$W_{10} = \frac{F_0}{I_{10}}; W_{20} = \frac{F_0}{I_{20}}; W_{30} = \frac{F_0}{I_{30}}$$

$$W_{10} = W_1 = \frac{F_1}{I_1}; W_{21} = W_{20} - W_{10}; W_{32} = W_{30} - W_{20}$$

$$q_{10} = \frac{I_{10}}{j_1}; q_{20} = \frac{I_{20}}{j_1}; q_{30} = \frac{I_{30}}{j_1}; j_1 = \frac{I_1}{q_1}$$

$$k_3 \approx 0.62\sqrt[4]{d} = 0.64\sqrt[8]{q} = 0.54\sqrt[8]{I}$$

$$k'_3 = 0.54\sqrt[8]{I_{10}}; k''_3 = 0.54\sqrt[8]{I_{20}}; k'''_3 = k_{31} = \sqrt[8]{I_{30}}$$

$$h_{10} = \frac{I_{10}W_{10}}{j_1 c_1 k'_3}; h_{21} = \frac{I_{20}W_{21}}{j_1 c_1 k''_3}; h_{32} = \frac{I_{30}W_{32}}{j_1 c_1 k'''_3}$$

$$h_{30} = h_{10} + h_{21} + h_{32} = h_{20} + h_{32} \qquad h_{20} = h_{10} + h_{21}$$

$$L'_S = W_{10}^2 \lambda_S \frac{h_{10}}{3}; L''_S = W_{20}^2 \lambda_S \frac{h_{20}}{3};$$

$$L'''_S = W_{30}^2 \lambda_S \frac{h_{30}}{3}$$

$$I_{10} = \frac{k_u U_{\max}}{\omega W_{10}^2 \lambda \left(h'_{\max} + \frac{h'_{12}}{3n_\lambda} \right)};$$

$$I_{20} = \frac{k_u U_{\max}}{\omega W_{20}^2 \lambda \left(h''_{\max} + \frac{h''_{12}}{3n_\lambda} \right) - x_{c2}};$$

$$I_{30} = \frac{k_u U_{\max}}{\omega W_{30}^2 \lambda \left(h'''_{\max} + \frac{h'''_{12}}{3n_\lambda} \right) - x_{c2}}$$

$$h'_{max} = m_{max} I_{10} - \frac{h'_{12}}{3n_{\lambda}}$$

$$h''_{max} = m_{max} I_{20} - \frac{h''_{12}}{3n_{\lambda}} + \frac{x_{c2}}{\omega W_{20}^{2} \lambda}$$

$$h'''_{max} = m_{max} I_{30} - \frac{h'''_{12}}{3n_{\lambda}} + \frac{x_{c3}}{\omega W_{30}^{2} \lambda}$$

$$m_{max} = \frac{k_u I_{10}}{\omega \lambda F_0^{2}}$$

$$x_{c2} = \omega W_{20}^{2} \lambda \left[U_{max} \left(m'_1 - m'_2 \right) - \frac{h''_{12} - h'_{12}}{3n_{\lambda}} \right]$$

$$x_{c3} = \omega W_{30}^{2} \lambda \left[U_{max} \left(m'_1 - m'_3 \right) - \frac{h'''_{12} - h'_{12}}{3n_{\lambda}} \right]$$

$$h''_{12} - h'_{12} = h_{20} - h_{10}; h'''_{12} - h'_{12} = h_{30} - h_{10}$$

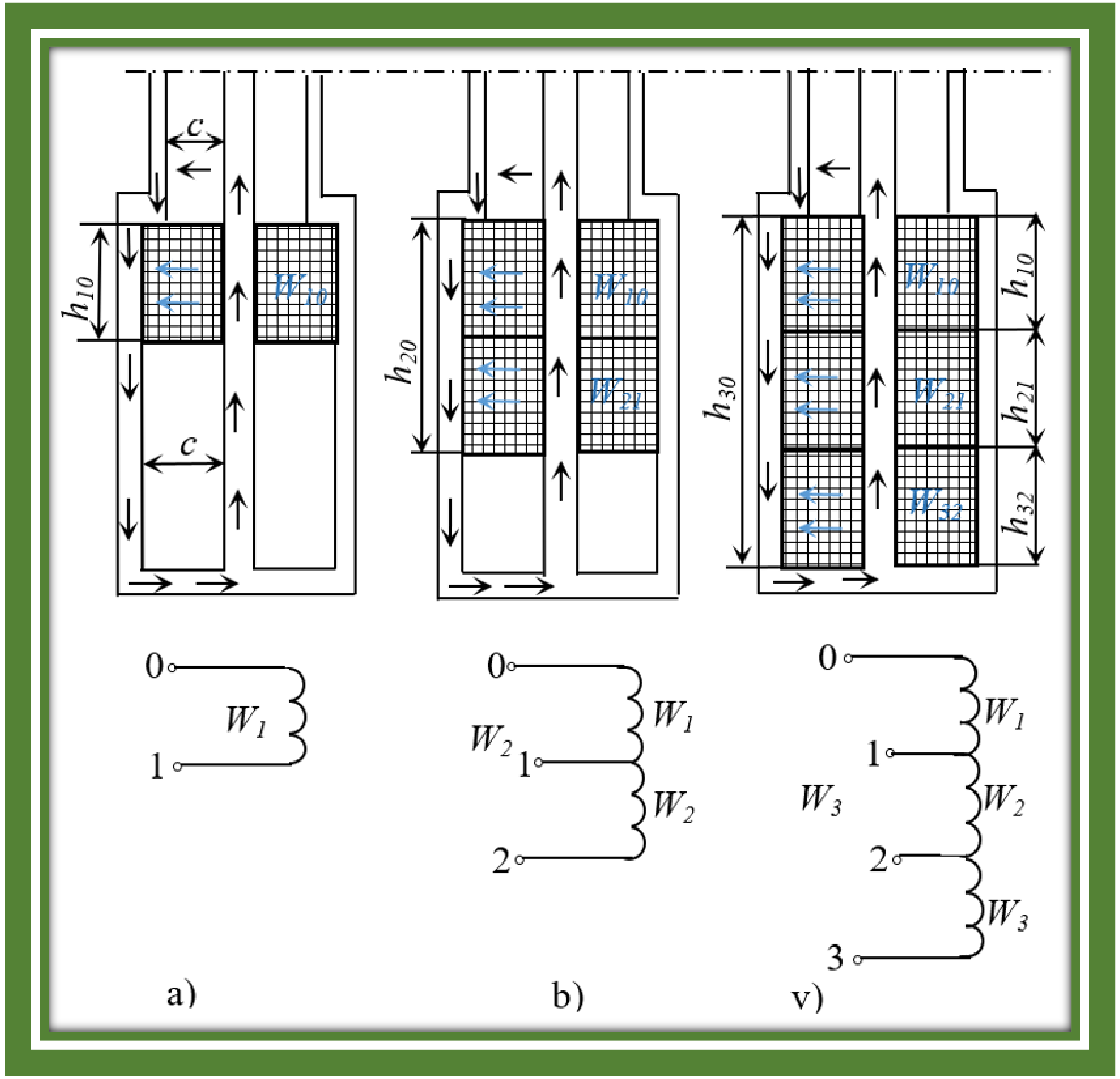
$$U_{max} \left(m'_1 - m'_2 \right) = \left(I_{10} - I_{20} \right) m_{max}$$

$$U_{max} \left(m'_1 - m'_3 \right) = \left(I_{10} - I_{30} \right) m_{max}$$

$$x_{c2} = \omega W_{20}^{2} \lambda \left[m_{max} \left(I_{10} - I_{20} \right) - \frac{h_{20} - h_{10}}{3n_{\lambda}} \right]$$

$$x_{c3} = \omega W_{30}^{2} \lambda \left[m_{max} \left(I_{10} - I_{30} \right) - \frac{h_{30} - h_{10}}{3n_{\lambda}} \right]$$

To the calculation of the sectional excitation winding



CONCLUSIONS

The calculation of the AC stabilizer on the principle of induction levitation is carried out on the basis of the equations of magnetomotive forces, currents and overheating, induction in the steel of the magnetic circuit and mechanical forces. Analytical relationships between the main parameters and geometric dimensions are determined at the stage of performing the technical task in the calculation and design of an AC stabilizer based on the principle of levitation. The calculation steps can be used for various variants of current stabilizers. Connecting the sections of the excitation winding of these stabilizers allows you to get different rated currents. Determining the output characteristics, establishing analytical relationships between the initial data and the output parameters of the stabilizer is one of the stages of the algorithm for solving the problems of designing the parameters of the AC stabilizer using the effect of induction levitation.