
Model observer using an algorithm of optimal pole placement and its application for the spacecraft control

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For a multivariable system an observer based on the optimal pole placement method is built. An analytical solution of the problem to estimate the equilibrium of orientation of the International Space Station is received.

Keywords: *multivariable system, optimal pole placement, equilibrium orientation, matrix feedback observer.*

REFERENCES

- [1] Zhou K., Doyle J.C. Essentials of robust control. *Upper Saddle River*, New Jersey, Prentice Hall, 1998.
- [2] Kuzovkov N.T. *Modal control and monitoring devices*. Moscow, Nauka, 1976 [in Russian].
- [3] Zubov N.E., Mikrin E.A., Misrikhanov M.Sh., Ryabchenko V.N. Modification of the method pole placement and its application in spacecraft motion control tasks. *Izvestia Rossiiskoi Akademii Nauk. Teoriya i Systemy Upravleniya*, 2013, no. 2, pp. 118–132 [in Russian].
- [4] Zubov N.E., Mikrin E.A., Misrikhanov M.Sh., Ryabchenko V.N. Synthesis of control law for spacecraft optimal pole placement of the closed-loop control system. *Izvestia Rossiiskoi Akademii Nauk. Teoriya i Systemy Upravleniya*, 2012, no. 3, pp. 88–111 [in Russian].
- [5] Zubov N.E., Mikrin E.A., Ryabchenko V.N., etc. Application of the method pole placement to solving problems of observation and identification. *Izvestia Rossiiskoi Akademii Nauk. Teoriya i Systemy Upravleniya*, 2013, no. 1, pp. 135–151 [in Russian].

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