

Investigation on absolute stability of regulated systems in a simple critical case

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Abstract: A new method for studying of absolute stability of the equilibrium position of nonlinear regulated systems in a simple critical case by evaluating improper integrals along the solutions of the system is proposed. Sectors are found, where the equilibrium position of the system is absolutely stable and the Aizerman problem has a positive solution. The effectiveness of the method is shown in the example.

Keywords: Absolute stability, non-singular transformation, properties of solutions, improper integrals, Aizerman problem, absolute stability sectors

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REFERENCES

- [1] Aisagaliev S.A. "About determination of a region of absolute stability of forced movements in non-linear systems", *Izv. AS USSR. Technique cibernetics*, No. 5, pp. 38-48, 1969.
- [2] Aisagaliev S.A. "About determination of a region of absolute stability control system with several nonlinear elements", *USSR. Automation and Remote Control*, No. 12, pp. 83-94, 1970.
- [3] Aisagaliev S.A. "To the theory of absolute stability of regulated systems", *Differential equations*, V. 30, No. 5, pp. 748-757, 1994.
- [4] Aisagaliev S.A. "Theory of regulated systems", – *Almaty: Kazakh University*, – 234 p., 2000.
- [5] Aisagaliev S.A. "Stability theory of dynamical systems", – *Almaty: Kazakh University*, – 216 p., 2012.
- [6] Aisagaliev S.A., Kalimoldayev M.N. "Certain problems of Synchronization theory", *Journal Inverse Ill Posed Problems*, 21, – pp. 159-175, 2013.