# The near optimality of the stabilizing control in a weakly nonlinear system with state-dependent coefficients

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**Abstract:** Currently State-Dependent Riccati Equation (SDRE) technique is quite a popular control approach for the nonlinear feedback control algorithm. However, it needs online solving the SDRE at every sample time that may require high performance computational resources for difficult control tasks. The new SDRE-based approach for constructing nonlinear stabilizing regulator was proposed in [1, 2] to overcome that problem. It deals with weakly nonlinear system with coefficients depending on the state and the formal small parameter. The proposed approach leads to computationally effective control because it uses analytical expressions. This paper is dedicated to near optimality of nonlinear stabilizing control constructed using that approach. First investigation of that problem was made in [3]. Now we use another form of optimal control and gain matrix. The theoretical results analogous to [3] are obtained and appropriate illustrative example of optimal control problem where formal small parameter equals to unit is considered. This work was supported by the Russian Science Foundation (Project No. 14-11-00692).

**Keywords:** weakly nonlinear systems, stabilizing control, small parameter, state-depended Riccati equations, optimal control.

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## References

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