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Multivariable Feedback Controllers for MHD Instabilities Suppression in a Tokamak Based on Simple Model of Coupled Van Der Pole Generators System IGOR SEMENOV, Kurchatov Institute, YURIY MITRISHKIN, Inst. of Control Science Russia — It was shown earlier that the behavior of coupled large scale resonant MHD perturbations in a tokamak has many common features with the excitation of oscillations in a system of coupled Van der Pole (VDP) generators. The VDP model was used to develop a multivariable controller for suppression of MHD perturbations. The controller designed is based on the combined principle of the feedback compensation of internal links between resonant magnetic surfaces and derivative damping of self-oscillations in each control channel. Numerical simulations of the nonlinear feedback control system containing the plant model with six VDP generators coupled and the controller designed have shown that it is possible to get fast suppression of self-oscillations in a wide range of system parameters. Thus the controller provides good robust properties of the feedback system.

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