NOISE-INDUCED PHENOMENA IN KALDOR MODEL OF THE BUSINESS CYCLE

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We consider the macroeconomic Kaldor-type dynamical model [1] under random disturbances

$$\begin{cases} \dot{Y} = \alpha[I(Y) - \beta K - Y] + \sigma_\alpha [I(Y) - \beta K - Y]\dot{w}_\alpha - \sigma_\beta \alpha K \dot{w}_\beta + \sigma \dot{w}, \\ \dot{K} = I(Y) - (\beta + 1)K - \sigma_\beta K \dot{w}_\beta + \sigma \dot{w}, \end{cases}$$

where w_α, w_β, w are the standard Wiener processes and σ_α, σ_β, σ are noise intensities.

A full parametrical analysis of equilibria and cycles of the deterministic model is developed and zones of co-existing of stable attractors are found.

We study the probabilistic properties of stochastic attractors using the stochastic sensitivity function technique [2]. A phenomenon of the noise-induced generation of mixed-mode oscillations in zones of a single attractor (equilibrium or cycle) under additive noise ($\sigma_\alpha = \sigma_\beta = 0$) is observed. In zones of co-existing of stable attractors transitions between these attractors caused by additive noise are studied using confidence domain method [2]. In the case of the influence of parametrical noise ($\sigma_\alpha \neq 0, \sigma_\beta \neq 0$) on the system phenomena of stabilization and transition to chaos are found.

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References

1. *Kaldor N.A.* A model of the trade cycle. // Economic Journal, 50, 1940. 78-92.
2. *Bashkirseva I.A., Ryashko L.B.* Sensitivity analysis of stochastic attractors and noise-induced transitions for population model with Allee effect. // Chaos, 21, 2011. 047514.