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### Bifurcational Mechanism of Multistability Formation and Frequency Entrainment in a van der Pol Oscillator with an Additional Oscillatory Circuit

Sergey Astakhov<sup>1</sup>

Oleg Astakhov<sup>2</sup>

Vladimir Astakhov<sup>3</sup>

Jürgen Kurths<sup>4</sup>

<sup>1</sup>Information Security of Automated Systems Dept., Yuri Gagarin Technical University of Saratov, Politekhnikeskaya st. 77, Saratov 410054, Russian Federation

<sup>2</sup>Department of Dynamic Modeling and Biomedical Engineering, Saratov State University, Astrakhanskaya st. 83, Saratov 410012, Russian Federation

<sup>3</sup>Radioelectronics and Telecommunications Dept., Yuri Gagarin Technical University of Saratov, Politekhnikeskaya st. 77, Saratov 410054, Russian Federation

<sup>4</sup>Potsdam Institute for Climate Impact Research (PIK), Potsdam 14473, Germany

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In this paper, the bifurcational mechanism of frequency entrainment in a van der Pol oscillator coupled with an additional oscillatory circuit is studied. It is shown that bistability observed in the system is based on two bifurcations: a supercritical Andronov–Hopf bifurcation and a sub-critical Neimark–Sacker bifurcation. The attracting basin boundaries are determined by stable and unstable invariant manifolds of a saddle two-dimensional torus.

**Keywords:** Multimode oscillators; bifurcations; multistability formation

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