Texas Tech University. Pure Mathematics Colloquium.
Current Advances in Mathematics.

# Long-time influence of small perturbations

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**ABSTRACT.** I will consider an oscillator with one degree of freedom and systems which are close to this simple object. For these examples, recent results on long-time influence of small deterministic and **stochastic perturbations** will be demonstrated. Such problems as stochasticity of long-time behavior of pure deterministic systems, metastability, and stochastic resonance will be considered. These results are based on the modified averaging principle, limit theorems for large deviations, diffusion approximation. Then I will describe a general approach to this type of problems and shortly consider (if I have time) various PDE problems like linear and nonlinear PDE's with a small parameter in higher derivatives, homogenization, pattern formation in reaction-diffusion equations.