# Abstract of the tutorial Stochastic Dynamics with Aerospace Applications


The tutorial consists of the 14 topics. For each topic, a numerical example in Matlab&Simulink and tasks for self-control are provided. You can find the scripts for the tutorial at the following link:

https://github.com/m-trifonov/Stochastic-Dynamics

**Content**

**Topic 01** – Calculation of statistical characteristics and simulation of random variables and events.
**Topic 02** – Calculation of a mean value and a variance of the stochastic process for its realization.
**Topic 03** – Calculation of the covariance function of a stochastic process.
**Topic 04** – Calculation of a spectral density of the stochastic process
**Topic 05** – Frequency domain analysis
**Topic 06** – Shaping filters.
**Topic 07** – Statistical analysis of an ergodic LTI system using the Monte-Carlo method.
**Topic 08** – Statistical analysis of a non-ergodic system using the Monte-Carlo method.
**Topic 09** – Moment's equations method.
**Topic 10** – Estimation problem on a full sample in a dynamic system using the least square method.
**Topic 11** – Estimation problem on a full sample in a linear system.
**Topic 12** – Estimation problem on a full sample in a non-linear system.
**Topic 13** – Recurrent estimation of a linear system state.
**Topic 14** – Simulation modeling using Kalman filter.