TUTORIAL – STOCHASTIC DYNAMICS WITH AEROSPACE APPLICATIONS

Topic 01 – Calculation of statistical characteristics and simulation of random variables and events

T01_Script_01.m	**Simulation of a three-dimensional Gaussian vector**
Description …coming soon…	

Topic 02 – Calculation of the mean value and variance of a stochastic process for its realization

T02_SimModel_01.slx	**Calculation of a mean and a variance (discrete time)**
T02_SimModel_02.slx	**Calculation of a mean and a variance (continuous time)**
Description …coming soon…	

Topic 03 – Calculation of the covariance function of a stochastic process

T03_Script_01.m	**Covariance function**
T03_SimModel_01.slx	
Description …coming soon…	

Topic 04 – Calculation of the spectral density of a stochastic process

T04_Script_01.m	**Spectral density**
T04_Script_02.m	**Power spectral density estimate using the Fourier transformation**
T04_Script_03.m	**Periodogram & Welch power spectral density estimate**
Description …coming soon…	

Topic 05 – Frequency domain analysis

T05_Script_01.m	**Frequency domain analysis of LTI systems (spectral densities)**
Description …coming soon…	

Topic 06 – Shaping filters

T06_Script_01.m	**Shaping filters**
T06_SimModel_01.slx	
Description …coming soon…	

Topic 07 – Statistical analysis of the ergodic LTI system using the Monte-Carlo method

T07_SimModel_01.m	**Statistical analysis of the ergodic LTI system using Monte-Carlo method**
Description …coming soon…	

Topic 08 – Statistical analysis of non-ergodic system using the Monte-Carlo method

T08_Script_01.m	**Monte-Carlo simulation**
Description …coming soon…	

Topic 09 – Moment's equations method

T09_Script_01.m	**Moment's equations**
Description …coming soon…	

Topic 10 – Estimation problem on a full sample in a dynamic system using the least square method

T10_Script_01.m	**Calculation the covariance matrix of state estimation errors**
Description …coming soon…	

Topic 11 – Estimation problem on a full sample in a linear system

T11_Script_01.m	**Estimation problem on a full sample in a linear system**
Description …coming soon…	

Topic 12 – Estimation problem on a full sample in a non-linear system

T12_Script_01.m	**Estimation problem on a full sample in a non-linear system using the least square method**
T12_Script_02.m	**Formation of a normalized vector of the estimation errors**
Description …coming soon…	

Topic 13 – Recurrent estimation of the linear system state

T13_Script_01.m	**Kalman filter**
Description …coming soon…	

Topic 14 – Simulation modeling using Kalman filter

T14_Script_01.m	**Simulation modeling using Kalman filter**
Description …coming soon…	

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*Description of the script or model name

T00_	Script_ / SimModel	00	.m/.slx
number of the topic	m-file script or simulink model	number of the script or model in the topic	file extension