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# A. Annex
# List of Simulation Programs

The simulation programs listed below serve education as examples and templates on the basis of which the Students can create their own programs for investigating various system and control models not considered in the present book. The programs can be downloaded by a common Internet browser from the site:

`http://www.bgk.uni-obuda.hu/szervezeti_egysegek/cra/education/`

from the folder
`System_and_Control_Theory_Programs/`.

- `Double_AdInvDYn_DynFric123_DistForce.sce`: for studying the "*Adaptive Inverse Dynamics Controller*" with LuGre friction and disturbance forces;
- `Belousov_Zhabotinsky_FKN.sce`: simulation for the "Belousov-Zhabotinsky Reaction" in (6.12);
- `Belousov_Zhabotinsky_Stac_Sol.xls`: determines the stationary solutions of (6.12) for $f \in [0.1, 2.0]$;
- `Belousov_Zhabotinsky_Stab.sce`: analyzes stability of the stationary solutions for $f \in [0.1, 2.0]$;
- `Belousov_Zhabotinsky_Stac_Sol_v2.xls`: determines the stationary solutions of (6.12) for $f \in [0.5, 2.40]$;
- `Belousov_Zhabotinsky_Stab_v2.sce`: analyzes stability of the stationary solutions for $f \in [0.5, 2.40]$;


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- Brusselator.sce: simulates the Brusselator model and analyzes the stability of its (non-stationary) solutions;
- Brusselatorn.sce: the same as the above program for neighboring initial conditions;
- business_function.sce: function definition for the SCICOS program business.cos describing the operation of the financial model;
- Chua_Matsumoto_Functions.sce: function definition for the SCICOS program
Chua_Matsumoto.cos simulating the "*Chua-Matsumoto Circuit*",
Chua_Matsumoto_Superblock.cos defines a "super-block" for this program;
- Chua_VS_SM.sce: simple SCILAB simulator for the VS/SM controller in the case of a *Chua-Matsumoto Circuit*";
- Chua_VS_SM_functions.sce: defines functions for the more sophisticated VS/SM simulator in SCICOS vssm.cos;
- Chua_Matsumoto_Functions_for_MRAC.sce: defines functions for the MRAC controller simulating the control of a *Chua-Matsumoto Circuit* by Chua_Matsumoto_MRAC.cos;
- Duffing_Synchr_Functions.sce: defines functions for the
Duffing.cos simulator synchronizing two different *Duffing Oscillators*, and
Canonical_Duffing_Synchr.cos forcing a Duffing Oscillator to move along a "canonical trajectory";
- FHN_Function.sce: defines functions for the FHN Neuron simulator FHN.cos;
- Gr_Schm_no_norm.sce and Null_Space_no_norm.sce:
application of the *Gram-Schmidt Algorithm* for investigating matrices;
- lorenz.sce and lorenz.cos: function definition and simulator for the *Lorenz System*;
- Chua_Matsumoto_Functions_for_MRAC.sce: defines functions for the novel RFPT-based MRAC controller simulated by
Chua_Matsumoto_MRAC.cos;
- TRAD_MRAC_kocsi_rud_kosar_rt_Hh_integral.sce: traditional MRAC controller for the Cart+Beam+Hamper system designed by the use of a Lyapunov function;

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- PID_MRAC_Fixp_Ir_kocsi_rud_kosar_rt_RIR.sce: the novel RFPT-based MRAC controller for the Cart+Beam+Hamper system;
- Optimal.xls: simple EXCEL-SOLVER-Visual Basic example for optimal Receding Horizon Control;
- RFPT_Fuzzy_Tuned.sce: RFPT-based adaptive control improved with fuzzy tuning for one of its control parameters;
- Chua_Matsumoto_Functions_for_CTRL.sce: defines functions for the RFPT-based adaptive control of a *Chua-Matsumoto Circuit* simulated by the program Chua_Matsumoto_Control.cos;
- Roessler_Function.sce, and Roessler.cos simulate the operation of the Rössler System;
- VanDerPol_Functions.sci defines function for the program VanDerPolSimulation.cos simulating the operation of the *van der Pol Oscillator*;
- VanDerPol_VS_SM.sci: SCILAB program demonstrating the VS/SM controller for the control of the *van der Pol Oscillator*;

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