Random Generation of Hybrid Automaton (HyRG)

k : number of trials

m : number of locations

n : number of variables

randgen_hybridautomaton(m, n, options)

The following options are:

- -t : randomly generate time-dependent switching system.
- -g : randomly generate model included self-loop transitions.
- -s : randomly generate model for sanity checking.
- -ss : enable translation from SpaceEx XML model to Simulink/Stateflow model.
- -ci : randomly generate constant invariants, constant guard conditions.
- -si : randomly generate invariants and guard conditions as symbolic expression algebra of state variables.
- -cr : update state variables to random constants.
- -sr : update state variables to their random symbolic expression algebra.

Options for randomly generating different flow dynamics:

Default : randomly generate a flow dynamic based on a matrix whose all eigenvalues are positive.

- -z : randomly generate a flow dynamic based on a matrix whose all eigenvalues are zero.
- -n : randomly generate a flow dynamic based on a matrix whose all eigenvalues are negative
- -pn : randomly generate a flow dynamic based on a matrix whose eigenvalues are either positive or negative.
- -nz : randomly generate a flow dynamic based on a matrix whose eigenvalues are either zero or negative.
- -pnz : randomly generate a flow dynamic based on a matrix whose eigenvalues are positive, zero or negative.
- -pr : randomly generate a flow dynamic based on a matrix whose eigenvalues have positive real parts.
- -nr : generate a flow dynamic based on a matrix whose eigenvalues have negative real parts.
- -i : generate a flow dynamic based on a matrix whose all eigenvalues are purely imaginary.
- -rd : generate a flow dynamic by randomly selecting one of all previous options.
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Generate bouncing ball examples : ball_production(k,m,n)

Generate thermostat (heater) examples : heater_production(k,m,n)