

```
[1] import tellurium as te
te.newTiledFigure(rows=2, cols=2)
```

<tellurium.plotting.engine_plotly.PlotlyTiledFigure at 0x7f4597ea8a90>

```
[2] // Author information:
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// - Organization: University of Washington
%model ./model/BIOMD0000000144.xml
// -- Begin Antimony block converted from BIOMD0000000144.xml
// Created by libAntimony v2.9.3
model *Model_generated_by_BIOCHAM()

// Compartments and Species:
compartment nuclei, cytoplasm;
species MPFc in cytoplasm, preMPFc in cytoplasm, StgPc in cytoplasm, Weelc in cytoplasm;
species $WeelPc in cytoplasm, N in nuclei, Weeln in nuclei, WeelPn in nuclei;
species Stgm in cytoplasm, Xp in cytoplasm, Stgc in cytoplasm, Xm in cytoplasm;
species MPFn in nuclei, preMPFn in nuclei, StgPn in nuclei, Stgn in nuclei;
species FZYa in nuclei, IEa_1 in nuclei;

// Assignment Rules:
WeelPc := (WeelT - N*E_1*(Weeln + WeelPn))/(1 - N*E_1) - Weelc;
CycBT := (1 - N*E_1)*(MPFc + preMPFc) + N*E_1*(MPFn + preMPFn);
StgPT := (1 - N*E_1)*StgPc + N*E_1*StgPn;
StgT := (1 - N*E_1)*Stgc + N*E_1*Stgn;
StringTotal := StgPT + StgT;

// Reactions:
R_1: => MPFc; ksc*cytoplasm;
R_2: preMPFc => MPFc; cytoplasm*(kstgp + kstg*StgPc)*preMPFc;
R_3: MPFc => preMPFc; cytoplasm*(kweep + kwee*Weelc)*MPFc;
R_6: preMPFc => ; cytoplasm*kdc*preMPFc;
R_7: MPFc => ; cytoplasm*kdc*MPFc;
R_8: Weelc => $WeelPc; cytoplasm*((kiweep + kiwee*MPFc)*Weelc/(Jiwee + Weelc));
R_9: $WeelPc => Weelc; cytoplasm*(kawee*WeelPc/(Jawee + WeelPc));
R_10: Stgm => ; nuclei*(kmp*Stgm/(Jm + Stgm) + kdm*Xp*Stgm);
R_12: => Stgc; cytoplasm*ksstg*Stgm;
R_13: Stgc => StgPc; cytoplasm*((kastgp + kastg*MPFc)*Stgc/(Jastg + Stgc));
R_14: StgPc => Stgc; cytoplasm*(kistg*StgPc/(Jistg + StgPc));
R_15: Stgc => ; cytoplasm*kdstg*Stgc;
R_16: StgPc => ; cytoplasm*kdstg*StgPc;
R_19: MPFc => ; cytoplasm*(kt*MPFc*E_1*N/(1 - N*E_1));
importofMPFintocytoplasm_1: => MPFc; nuclei*(kout_1*MPFn*E_1*N/(1 - N*E_1));
_16: => MPFn; cytoplasm*kt*MPFc;
importofMPFfromnucleus_1: MPFn => ; nuclei*kout_1*MPFn;
exportofMPFfromnucleus_1: MPFn => preMPFc; nuclei*(kout_1*preMPFn*N*E_1/(1 - N*E_1));
R_20: preMPFc => ; cytoplasm*(kt*preMPFc*E_1*N/(1 - N*E_1));
_18: => preMPFn; cytoplasm*kt*preMPFc;
exportofpreMPFnfromnucleus_1: preMPFn => ; nuclei*kout_1*preMPFn;
R_21: WeelPn => ; nuclei*koutw_1*WeelPn;
_182_1: => $WeelPc; nuclei*(koutw_1*WeelPn*N*E_1/(1 - N*E_1));
R_22: $WeelPc => ; cytoplasm*(kinw_1*WeelPc*E_1*N/(1 - N*E_1));
_20: => WeelPn; cytoplasm*kinw_1*WeelPc;
R_23: Weeln => ; nuclei*koutw_1*Weeln;
_22: => Weelc; nuclei*(koutw_1*Weeln*N*E_1/(1 - N*E_1));
R_24: Weelc => ; cytoplasm*(kinw_1*Weelc*E_1*N/(1 - N*E_1));
_24: => Weeln; cytoplasm*kinw_1*Weelc;
R_25: StgPn => ; nuclei*kouts_1*StgPn;
_26: => StgPc; nuclei*(kouts_1*StgPn*E_1*N/(1 - N*E_1));
R_26: StgPc => ; cytoplasm*(kins_1*StgPc*E_1*N/(1 - N*E_1));
_28: => StgPn; cytoplasm*kins_1*StgPc;
R_27: Stgn => ; nuclei*kouts_1*Stgn;
_30: => Stgc; nuclei*(kouts_1*Stgn*E_1*N/(1 - N*E_1));
R_28: Stgc => ; cytoplasm*(kins_1*Stgc*E_1*N/(1 - N*E_1));
_32: => Stgn; cytoplasm*kins_1*Stgc;
R_29: preMPFn => MPFn; nuclei*(kstgp + kstg*StgPn)*preMPFn;
R_30: MPFn => preMPFn; nuclei*(kweep + kwee*Weeln)*MPFn;
R_33: preMPFn => ; nuclei*(kdn + kdn*FZYa)*preMPFn;
R_34: MPFn => ; nuclei*(kdn + kdn*FZYa)*MPFn;
R_37: IEa_1 => ; nuclei*(kiie*IEa_1/(Jiie + IEa_1));
R_38: => IEa_1; nuclei*(kaie*(1 - IEa_1)*MPFn/(Jaie + 1 - IEa_1));
R_39: => FZYa; nuclei*(kafzy*IEa_1*(1 - FZYa)/(Jafzy + 1 - FZYa));
R_40: FZYa => ; nuclei*(kifzy*FZYa/(Jifzy + FZYa));
R_41: Weeln => WeelPn; nuclei*((kiweep + kiwee*MPFn)*Weeln/(Jiwee + Weeln));
R_42: WeelPn => Weeln; nuclei*(kawee*WeelPn/(Jawee + WeelPn));
R_43: Stgn => StgPn; nuclei*((kastgp + kastg*MPFn)*Stgn/(Jastg + Stgn));
R_44: StgPn => Stgn; nuclei*(kistg*StgPn/(Jistg + StgPn));
R_45: Stgn => ; nuclei*kdstg*Stgn;
R_46: StgPn => ; nuclei*kdstg*StgPn;
Nuclei_1: => N; 0;
_50: => Xm; nuclei*ksxm_1*N;
_51: => Xp; cytoplasm*ksxp_1*Xm;

// Events:
_E0: at FZYa >= kez_1: MPFc = MPFc*((1 - N*E_1)/(1 - 1.95*N*E_1)), StgPn = StgPn/1.95,
Stgc = Stgc*((1 - N*E_1)/(1 - 1.95*N*E_1)), StgPc = StgPc*((1 - N*E_1)/(1 - 1.95*N*E_1)),
Stgn = Stgn/1.95, Weelc = Weelc*((1 - N*E_1)/(1 - 1.95*N*E_1)), WeelPn = WeelPn/1.95, Weeln
= Weeln/1.95, preMPFn = preMPFn/1.95, MPFn = MPFn/1.95, N = factor_1*N;

// Species initializations:
MPFc = 1;
preMPFc = 0;
StgPc = 0.8;
Weelc = 0;
N = 1;
Weeln = 0;
WeelPn = 0;
Stgm = 1;
Xp = 0;
Stgc = 0;
Xm = 0;
MPFn = 0;
preMPFn = 0;
StgPn = 0;
Stgn = 0;
FZYa = 0;
IEa_1 = 0;

// Compartment initializations:
nuclei = 1;
cytoplasm = 1;

// Variable initializations:
WeelT = 0.8;
E_1 = 7e-05;
kez_1 = 0.5;
factor_1 = 1.95;
ksc = 0.01;
kstgp = 0.2;
kstg = 2;
kweep = 0.005;
kwee = 1;
kdc = 0.01;
kiweep = 0.01;
kiwee = 1;
Jiwee = 0.05;
kawee = 0.3;
Jawee = 0.05;
kdm = 0.002;
Jm = 0.05;
kdm = 0.2;
ksstg = 0;
kastgp = 0;
kastg = 1;
Jastg = 0.05;
kistg = 0.3;
Jistg = 0.05;
kdstg = 0;
kt = 0.15;
kout_1 = 0;
koutw_1 = 0.01;
kinw_1 = 0.04;
kouts_1 = 0.02;
kins_1 = 0.08;
kdn = 0.01;
kdn = 1.5;
kiie = 0.4;
Jiie = 0.01;
kaie = 1;
Jaie = 0.01;
kafzy = 1;
Jafzy = 0.01;
kifzy = 0.2;
Jifzy = 0.01;
ksxm_1 = 0.0005;
ksxp_1 = 0.001;
StringT = 0.8;

// Other declarations:
var CycBT, StgPT, StgT, StringTotal;
const nuclei, cytoplasm, WeelT, E_1, kez_1, factor_1, ksc, kstgp, kstg;
const kweep, kwee, kdc, kiweep, kiwee, Jiwee, kawee, kdm, Jm, kdm;
const ksstg, kastgp, kastg, Jastg, kistg, Jistg, kdstg, kt, kout_1, koutw_1;
const kinw_1, kouts_1, kins_1, kdn, kdn, kiie, Jiie, kaie, Jaie, kafzy;
const Jafzy, kifzy, Jifzy, ksxm_1, ksxp_1, StringT;

// Unit definitions:
unit time_1 = 6e1 second;

// Display Names:
time_1 is "min";
E_1 is "E";
kez_1 is "kez";
factor_1 is "factor";
kstg is "kstgpp";
kwee is "kweepp";
kdc is "kdcpp";
kiwee is "kiweepp";
kdm is "kdmpp";
kastg is "kastgpp";
kt is "kin";
kout_1 is "kout";
koutw_1 is "koutw";
kinw_1 is "kinw";
kouts_1 is "kouts";
kins_1 is "kins";
kdn is "kdnpp";
ksxm_1 is "ksxm";
ksxp_1 is "ksxp";
R_1 is "Synthesis of MPFc";
R_2 is "Activation of MPFc";
R_3 is "Inactivation of MPFc";
R_6 is "Degradation of cyclin";
R_7 is "degradation of cyclin";
R_8 is "Inactivation of Weelc";
R_9 is "Activation of Weelc";
R_10 is "mRNA of Stg";
R_12 is "Synthesis of Stg";
R_13 is "activation of Stg";
R_14 is "inactivation of Stg";
R_15 is "degradation of Stgc";
R_16 is "degradation of active Stgc";
R_19 is "export of MPF from cytoplasm";
importofMPFintocytoplasm_1 is "import of MPF into cytoplasm";
_16 is "import of MPF into nucleus";
exportofMPFfromnucleus_1 is "export of MPF from nucleus";
importofpreMPFnfromnucleus_1 is "import of preMPF into cytoplasm";
R_20 is "export of preMPF from cytoplasm";
_18 is "import of preMPF into nucleus";
exportofpreMPFnfromnucleus_1 is "export of preMPFn from nucleus";
R_21 is "export of WeelP from nucleus";
_182_1 is "import of WeelP into cytoplasm";
R_22 is "export of WeelP from cytoplasm";
_20 is "import of WeelP into nucleus";
R_23 is "export of Weel from nucleus";
_22 is "import of Weel into cytoplasm";
R_24 is "export of Weelc from cytoplasm";
_24 is "import of Weel into nucleus";
R_25 is "export of StgP from nucleus";
_26 is "import of StgP into cytoplasm";
R_26 is "export of StgP from cytoplasm";
_28 is "import of StgP into nucleus";
R_27 is "export of Stg from nucleus";
_30 is "import of Stg into cytoplasm";
R_28 is "export of Stg from cytoplasm";
_32 is "import of Stg into nucleus";
R_29 is "activation of MPFn";
R_30 is "inactivation of MPFn";
R_33 is "degradation of preMPFn";
R_34 is "degradation of MPFn";
R_37 is "degradation of intermediary enzyme";
R_38 is "inactivation of intermediary enzyme";
R_39 is "activation of FZY";
R_40 is "inactivation of FZY";
R_41 is "inactivation of Weeln";
R_42 is "activation of Weeln";
R_43 is "activation of StgPn";
R_44 is "inactivation of StgPn";
R_45 is "degradation of Stgn";
R_46 is "degradation of StgPn";
Nuclei_1 is "Nuclei";
_50 is "Zygotic mRNA";
_51 is "Zygotic proteins";
end

// -- End Antimony block

%tasks ./experiment/Calzone2007-simulation-figure-1B.xml --master=True
// -- Begin PhraSEMDL block converted from Calzone2007-simulation-figure-1B.xml
// Created by libphrasedml v1.0.7
// Models
model1 = model "../model/BIOMD0000000144"
model2 = model model1 with ksstg = 0.02, kdstg = 0.015, StgPc = 0

// Simulations
sim1 = simulate uniform(0, 250, 1000)
sim2 = simulate uniform(0, 180, 1000)

// Tasks
task1 = run sim1 on model1
task2 = run sim2 on model2

// Outputs
plot "Nuclear Comp" task1.time vs task1.model1.Weeln, task1.model1.MPFn, task1.model1.StgPn
plot "Nuclear Comp (Log)" log10(task1.time) vs log10(task1.model1.Weeln),
log10(task1.model1.MPFn), log10(task1.model1.StgPn)
plot "X/mRNA" task2.time vs task2.model2.Stgm, task2.model2.Xm, task2.model2.Xp
plot "X/mRNA (Log)" log10(task2.time) vs log10(task2.model2.Stgm), log10(task2.model2.Xm),
log10(task2.model2.Xp)
// -- End PhraSEMDL block
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f.logx = <tellurium.plotting.engine_plotly.PlotlyFigure object at 0x7f4597e3e630>.False
f.logx = <tellurium.plotting.engine_plotly.PlotlyFigure object at 0x7f4597e08fd0>.True
f.logx = <tellurium.plotting.engine_plotly.PlotlyFigure object at 0x7f4597e34048>.False
f.logx = <tellurium.plotting.engine_plotly.PlotlyFigure object at 0x7f4597e34080>.True

