Two strain dengue

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ABSTRACT (original article):
Keywords:

CITATION (original article):

In[•]:=
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(*Latex dictionary*)
Format[mu]:=μ;
Format[ga]:=γ;Format[ga1]:=Subscript[γ,1];Format[ga2]:=Subscript[γ,2];
Format[t1]:=Subscript[θ,1];Format[t2]:=Subscript[θ,2];Format[th]:=θ;
Format[La]:=Λ;Format[be1]:=Subscript[β,1];Format[be2]:=Subscript[β,2];
Format[si1]:=Subscript[σ,1];Format[si2]:=Subscript[σ,2];
Format[et1]:=Subscript[η,1];Format[et2]:=Subscript[η,2];
Format[i1]:=Subscript[i,1];Format[i2]:=Subscript[i,2];
Format[y1]:=Subscript[y,1];Format[y2]:=Subscript[y,2];
Format[r1]:=Subscript[r,1];Format[r2]:=Subscript[r,2];
(*entering the closed model, packages*)
ClearAll["Global‘*"];
SetDirectory[NotebookDirectory[]];SetOptions[$FrontEndSession, NotebookAutoSave → True];
NotebookSave[];
AppendTo[$Path,"C:\\Users\\flori\\Dropbox\\EpidCRNmodels"];<<EpidCRN`;
(*Needs["RobertNachbar`CompartmentalModeling`"]*)

(*particular cases, key formulas
cDFE={i1→0,i2→0,y1→0,y2→0};cE2={i1→0,r1→0,y2→0};cE1={i2→0,r2→0,y1→0};cLa=La→mu;
csd=s→La/mu;
csym={ga1→ga,ga2→ga,t1→th,t2→th,(*La→0,mu→0,*)et1→1,et2→1};
csymG={ga1→ga,ga2→ga,t1→th,t2→th,La→0,mu→0,et1→1,et2→1};
cet={et1→1,et2→1};cChu={t1→0,t2→0,th→0,La→mu,et1→1,et2→1};
sd=La/mu;mR1=be1/(ga1+mu);mR2=be2/(ga2+mu);R1=mR1 sd;R2=mR2 sd;S2=1/mR2;S1=1/mR1;
k1=ga1/(ga1+mu+t1);a2c=1/k1;R12=mR2 (S1+ si2 r11);r11=k1(sd-S1);
R2c=R2/R12;*)

(*enter closed model, as first step*)
RNc={"S"+"I1"→2  "I1", "S"+"Y1" →  "Y1"+  "I1", "I1"→  "R1",
"S"+"I2" →2  "I2","S"+"Y2" →  "Y2"+ "I2", "I2"→  "R2",
 "R1"+  "I2"→ "I2"+  "Y2","R1"+  "Y2"→2  "Y2","Y2"→"R",
 "R2"+"I1"→"I1"+"Y1", "R2"+ "Y1"→2"Y1","Y1"→"R",
  "R1"→"S","R2"→"S","R"→"S"};
  (*enter open model, adding in and out 9 reactions *)
RN=Join[{0→"S"},RNc,{"S"→0,"I1" →0,"Y1" →0,"R1" →0,"I2" →0,"Y2" →0,"R2" →0,"R"→0}]
var={s,i1,y1,r1,i2,y2,r2,r};
minSiph[ToString/@var,asoRea[RN]]
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Out[•]=
$$\{0 \to S,\ I1 + S \to 2\,I1,\ S + Y1 \to I1 + Y1,\ I1 \to R1,\ I2 + S \to 2\,I2,\ S + Y2 \to I2 + Y2,\ I2 \to R2,$$
$$I2 + R1 \to I2 + Y2,\ R1 + Y2 \to 2\,Y2,\ Y2 \to R,\ I1 + R2 \to I1 + Y1,\ R2 + Y1 \to 2\,Y1,\ Y1 \to R,$$
$$R1 \to S,\ R2 \to S,\ R \to S,\ S \to 0,\ I1 \to 0,\ Y1 \to 0,\ R1 \to 0,\ I2 \to 0,\ Y2 \to 0,\ R2 \to 0,\ R \to 0\}$$

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Constraints generated: 1

Sample constraints: {s1 || s2 || s3 || s4 || s5 || s6 || s7 || s8}

All found siphons: {{1, 2, 3, 4, 5, 6, 7, 8}, {2, 3, 4, 5, 6, 7, 8}, {3, 4, 5, 6, 7, 8}, {4, 5, 6, 7, 8},
  {5, 6, 7, 8}, {6, 7, 8}, {7, 8}, {8}, {1, 3, 4, 5, 6, 7, 8}, {2, 4, 5, 6, 7, 8}, {3, 5, 6, 7, 8},
  {4, 6, 7, 8}, {5, 7, 8}, {6, 8}, {7}, {1, 2, 4, 5, 6, 7, 8}, {2, 3, 5, 6, 7, 8}, {3, 4, 6, 7, 8},
  {4, 5, 7, 8}, {5, 6, 8}, {6, 7}, {1, 4, 5, 6, 7, 8}, {2, 5, 6, 7, 8}, {3, 6, 7, 8}, {4, 7, 8}}

After minimality filter: {{8}, {7}}
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Out[•]=

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{{8}, {7}}
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