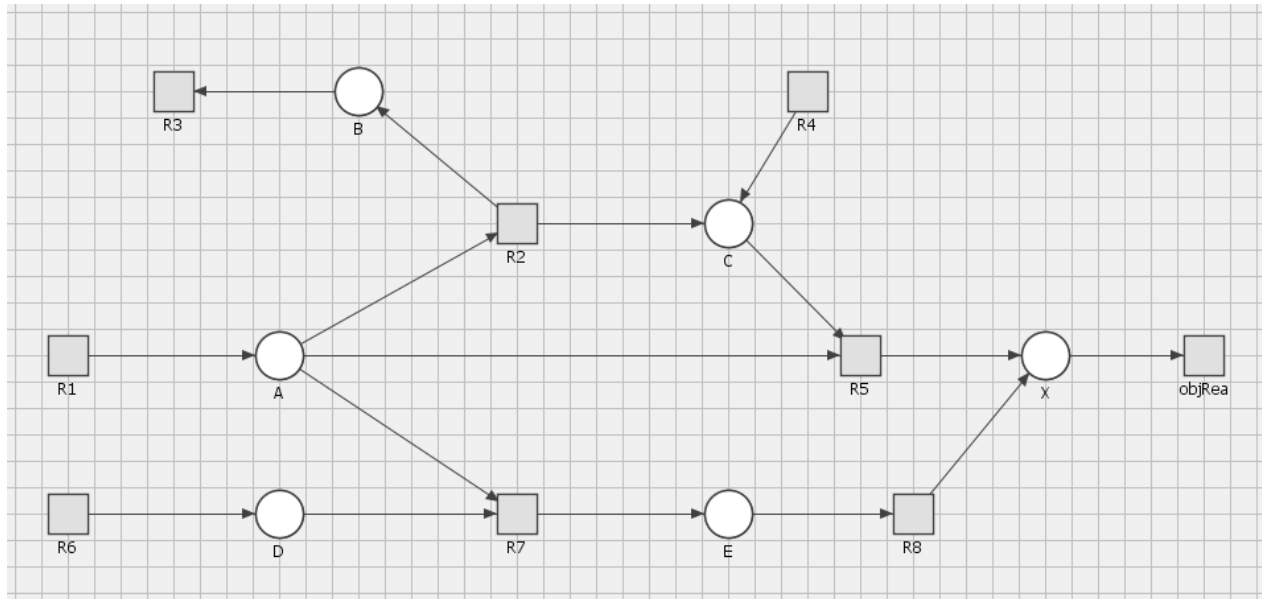**Net**: mcsNet_example.project

Manual sections/chapters:

   7.3 (Minimal cutting sets)

Description of the example:

   The net is taken from: Klamt, S. and Gilles, E. D. (2004). Minimal cut sets in biochemical reaction networks. *Bioinformatics,* 20(2), pages 226-234.

   There are three invariants in such a net:

1;0;0;0;0;1;1;1;1 support: {R1, R6, R7, objRea}
1;0;0;1;1;0;0;0;1 support: {R1, R4, R5, objRea}
2;1;1;0;1;0;0;0;1 support: {R1, R2, R3, R5, objRea}

MCS described in details in the aforementioned paper can be generated using Holmes, they are already present with the example project file in a separate file: mcsNet_example.mcs which can be loaded in the MCS Holmes window (given in a picture below) using "**Load all MCS**" button:

Details about the generator features and option for viewing the sets are given in chapter 7.3 of the Holmes manual. The window showing the results is given in the following picture:

Minimal Cutting Sets generator — □ ×

Obj. reaction: [--- ▼] Add Rem. Clear Comp. select. MCSs

Max. |CutSet|: [0] Max. set number: [300] ☐ Reduce MCSs [   ]

Generate MCS | STOP | Load one objR MCS | Load all MCS | Save all MCS ☑ Compute all MCS

Computed MCS options

ObjR MCSs: [t8.objRea ▼] ☑ Show full info

Save this objR MCS | Show MCS | Fragility

Log

```
MCS data for whole net have been read: 9 lists with sets.
========================================================
Transition/objR: objRea
Minimal Cuttin Sets list size: 11
MSC#0 [0]   : t0_R1;
MSC#1 [8]   : t8_objRea;
MSC#2 [4, 5]  : t4_R5; t5_R6;
MSC#3 [4, 6]  : t4_R5; t6_R7;
MSC#4 [4, 7]  : t4_R5; t7_R8;
MSC#5 [1, 3, 5]  : t1_R2; t3_R4; t5_R6;
MSC#6 [1, 3, 6]  : t1_R2; t3_R4; t6_R7;
MSC#7 [1, 3, 7]  : t1_R2; t3_R4; t7_R8;
MSC#8 [2, 3, 5]  : t2_R3; t3_R4; t5_R6;
MSC#9 [2, 3, 6]  : t2_R3; t3_R4; t6_R7;
MSC#10 [2, 3, 7]  : t2_R3; t3_R4; t7_R8;
========================================================

t0_R1   fragility = 1.0
t1_R2   fragility = 0.33333334
t2_R3   fragility = 0.33333334
t3_R4   fragility = 0.33333334
t4_R5   fragility = 0.5
t5_R6   fragility = 0.375
t6_R7   fragility = 0.375
t7_R8   fragility = 0.375
t8_objRea   fragility = 1.0
```