Appendix B: Analysis Modules correctness results
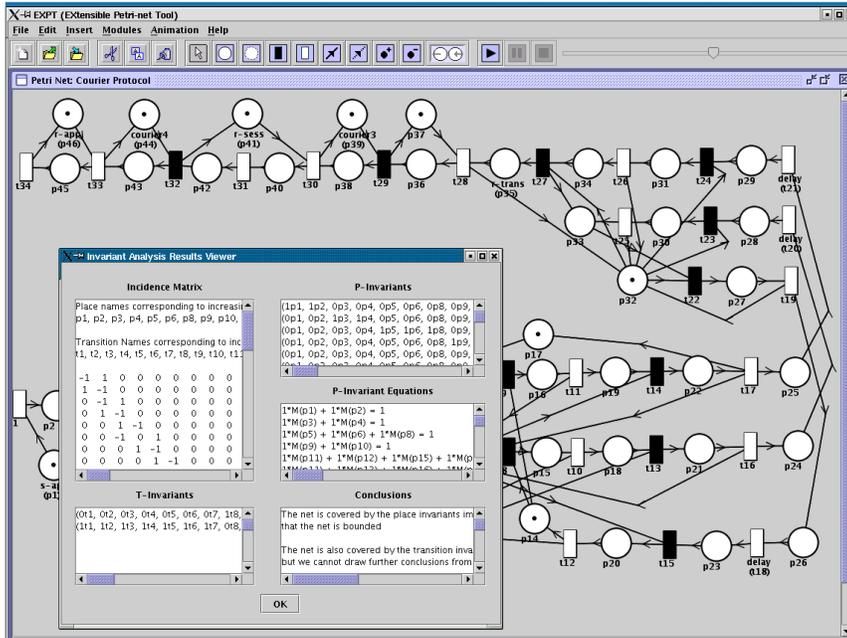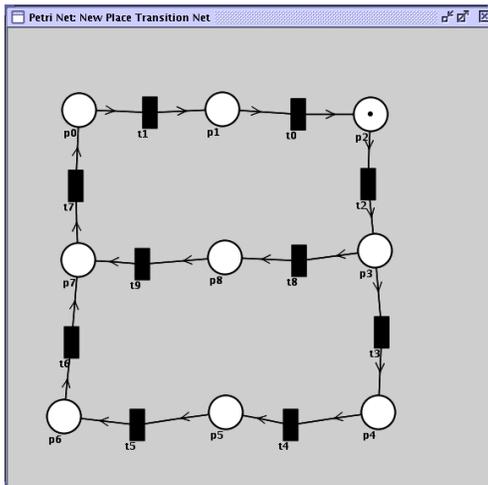
The Invariant Analysis Module running on the Courier Communications Protocol Petri net:
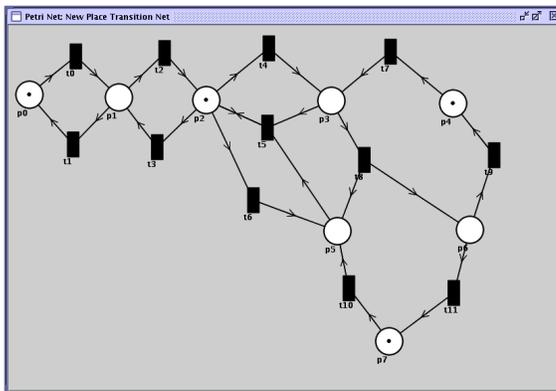

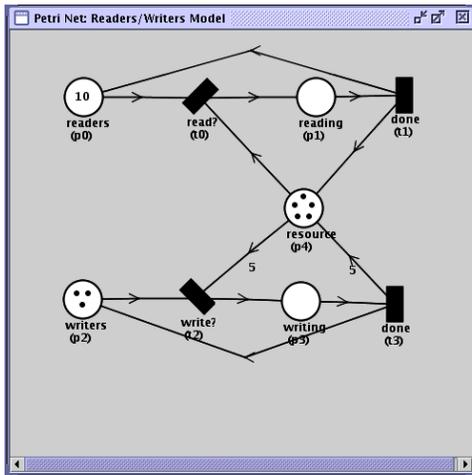## Test net 1

State Space Analysis - DaNAMiCS	State Space Analysis - EXPT
Net is live	Net is live
Net does not reach deadlock	Net does not reach deadlock
Net is safe	Net is safe
Net is bounded	Net is bounded
Invariant Analysis - DaNAMiCS	Invariant Analysis - EXPT
P-Invariants:	P-Invariants:
(p0,p1,p2,p3,p4,p5,p6,p7,p8)	(p0,p1,p2,p3,p4,p5,p6,p7,p8)
P-Invariant Equations:	P-Invariant Equations:
p0+p1+p2+p3+p4+p5+p6+p7+p8 = 1	p0+p1+p2+p3+p4+p5+p6+p7+p8 = 1
T-Invariants:	T-Invariants:
(t0,t1,t2,t3,t4,t5,t6,t7,0,0)	(t0,t1,t2,t3,t4,t5,t6,t7,0,0)
(t0,t1,t2,0,0,0,0,t7,t8,t9)	(t0,t1,t2,0,0,0,0,t7,t8,t9)

Test Net 2

State Space Analysis – DaNAMiCS	State Space Analysis – EXPT
The net is not live	The net is not live
Deadlock via:	The net reaches deadlock via:
t10,t7,t8,t4,t9,t8,t9,t0,t7,t8,	t0,t2,t4,t3,t1,t7,t0,t2,t4,t8,t8,t8,t9,t9,t7,t10
t7,t8,t2,t9,t9,t7,t7,t8,t11,t10,t8,t9,t4,t8,t7,	t7,t8,t8,t11,t10,t11,t10,t11,t10
t8,t11,t11,t10,t10	The net is not safe
The net is not safe	The net is not bounded
The net is not bounded	
Invariant Analysis – DaNAMiCS	Invariant Analysis – EXPT
No P-Invariants	No P-Invariants
T-Invariants:	T-Invariants:
(t0,t1,0,0,0,0,0,0,0,0,0,0)	(t0,t1,0,0,0,0,0,0,0,0,0,0)
(0,0,t2,t3,0,0,0,0,0,0,0,0)	(0,0,t2,t3,0,0,0,0,0,0,0,0)

Readers – Writers Petri Net

State Space Analysis – DaNAMiCS	State Space Analysis – EXPT
The net is live The system does not reach deadlock The net is not safe The net is bounded	The system is live The system does not reach deadlock The net is not safe The system is bounded
Invariant Analysis – DaNAMiCS	Invariant Analysis – EXPT
P-Invariants: (p0,p1,0,0,0) (0,p1,p2,5p3,0) (0,0,0,p3,p4) P-Invariant equations: p0 + p1 = 10 p1 + p2 + 5p3 = 5 p3 + p4 = 3 T-Invariants: (t0,t1,0,0) (0,0,5t2,5t3)	P-Invariants: (p0,p1,0,0,0) (0,p1,p2,5p3,0) (0,0,0,p3,p4) P-Invariant equations: p0 + p1 = 10 p1 + p2 + 5p3 = 5 p3 + p4 = 3 T-Invariants: (t0,t1,0,0) (0,0,5t2,5t3)

Single Transmitter Petri Net
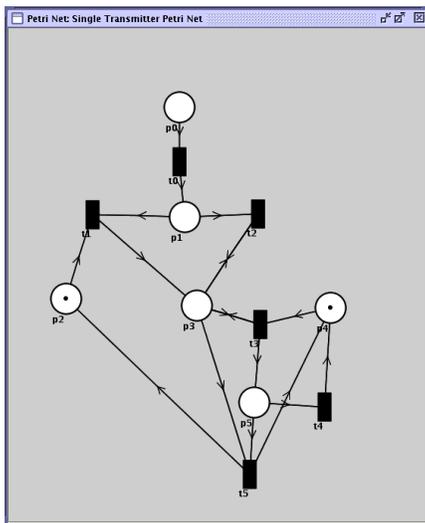
State Space Analysis – DaNAMiCS	State Space Analysis – EXPT
The net is not live	The net is not live
Deadlock via:	Deadlock via:
t0,t1,t3,t5	t0,t1,t3,t5
The net is safe	The net is safe
The net is not bounded	The net is not bounded
Invariant Analysis – DaNAMiCS	Invariant Analysis – EXPT
P-Invariants:	P-Invariants:
(0,0,p2,p3,0,0)	(0,0,p2,p3,0,0)
(0,0,0,0,p4,p5)	(0,0,0,0,p4,p5)
P-Invariant equations:	P-Invariant equations:
p2 + p3 = 1	p2 + p3 = 1
p4 + p5 = 1	p4 + p5 = 1
T-Invariants:	T-Invariants:
(0,0,0,t3,t4,0)	(0,0,0,t3,t4,0)