Model: TMRModel

Place Attributes:

Place Names	Initial Markings
BadMajority	0
Channel1	1
Channel1Failed	0
Channel2	1
Channel2Failed	0
Channel3	1
Channel3Failed	0
ErraticChannels	0
NoMajority	0
SafeState	0
SilentChannels	0
UnsafeState	0
Voters	2

Timed Activity:	CCF
Distribution Parameters	**Rate** fr_complex * (1-p_individual) * (Channel1->Mark()+Channel2->Mark()+Channel3->Mark())
Activation Predicate	(none)
Reactivation Predicate	(none)
Case Distributions	**case 1** (1-p_individual-p_ccf3of3)/(1-p_individual) **case 2** p_ccf3of3/(1-p_individual)

Timed Activity:	Channel1Failure
Distribution Parameters	**Rate** fr_complex * p_individual
Activation Predicate	(none)
Reactivation Predicate	(none)

Timed Activity:	Channel2Failure
Distribution Parameters	**Rate** fr_complex * p_individual
Activation Predicate	(none)
Reactivation Predicate	(none)

Timed Activity:	Channel3Failure
Distribution Parameters	**Rate** fr_complex * p_individual
Activation Predicate	(none)
Reactivation Predicate	(none)

Timed Activity:	Disagreement
Distribution Parameters	**Rate** r_disagreement
Activation Predicate	(none)
Reactivation Predicate	(none)

Timed Activity:	VotersFailure
Distribution Parameters	**Rate** fr_simple * Voters->Mark()
Activation Predicate	(none)
Reactivation Predicate	(none)

Instantaneous Activity:	Channel1FailureType
Case Distributions	**case 1** 1-p_erratic **case 2** p_erratic

Instantaneous Activity:	Channel2FailureType
Case Distributions	**case 1** 1-p_erratic **case 2** p_erratic

Instantaneous Activity:	Channel3FailureType

Case Distributions	**case 1** 1-p_erratic **case 2** p_erratic

Instantaneous Activity:	ErraticResults
Case Distributions	**case 1** 1-p_badmajority **case 2** p_badmajority

Instantaneous Activity:	prebufferedMRM
Case Distributions	**case 1** 1-p_MRM **case 2** p_MRM

Instantaneous Activities Without Cases:
CatastrophicFailure

Input Gate:	CheckCatastrophicFailure
Predicate	SafeState->Mark()+UnsafeState->Mark()==0 && (BadMajority->Mark()==1 || (SilentChannels->Mark()==2 && ErraticChannels->Mark()==1))
Function	;

Input Gate:	CheckMajorityErratics
Predicate	ErraticChannels->Mark()>=2
Function	ErraticChannels->Mark()=0;

Input Gate:	CheckNonCatastrophicFailure
Predicate	SafeState->Mark()+UnsafeState->Mark()==0 && (SilentChannels->Mark()==3 || Voters->Mark()==0 || NoMajority->Mark()==1 || (SilentChannels->Mark()==1 && ErraticChannels->Mark()==1))
Function	;

Output Gate:	CCF2of3
Function	if (Channel1->Mark()+Channel2->Mark()==2) {Channel1->Mark()=0; Channel2->Mark()=0; Channel1Failed->Mark()=1; Channel2Failed->Mark()=1;} else if (Channel1->Mark()+Channel3->Mark()==2) {Channel1->Mark()=0; Channel3->Mark()=0; Channel1Failed->Mark()=1; Channel3Failed->Mark()=1;} else if (Channel2->Mark()+Channel3->Mark()==2) {Channel2->Mark()=0; Channel3->Mark()=0; Channel2Failed->Mark()=1; Channel3Failed->Mark()=1;}

Output Gate:	CCF3of3

Function	if(Channel1->Mark()+Channel2->Mark()+Channel3->Mark()==3)
	{
	Channel1->Mark()=0;
	Channel2->Mark()=0;
	Channel3->Mark()=0;
	Channel1Failed->Mark()=1;
	Channel2Failed->Mark()=1;
	Channel3Failed->Mark()=1;
	}

Output Gate:	InexactVoting
Function	if (Channel1->Mark()+Channel2->Mark()+Channel3->Mark()>=2) NoMajority->Mark()=1;

Range Study Variable Assignments for Study *TMRParameter* in Project *TMR* :

Variable	Type	Range Type	Range	Increment	Increment Type	Function	n
fr_complex	double	Fixed	1.0E-5	-	-	-	-
fr_simple	double	Fixed	1.0E-6	-	-	-	-
p_MRM	double	Manual	[0.75, 0.85, 0.95]	-	-	-	-
p_badmajority	double	Fixed	0.1	-	-	-	-
p_ccf3of3	double	Fixed	0.025	-	-	-	-
p_erratic	double	Manual	[0.1, 0.3, 0.5]	-	-	-	-
p_individual	double	Manual	[0.8, 0.875, 0.95]	-	-	-	-
r_disagreement	double	Manual	[1.0E-4, 1.0E-5, 1.0E-6]	-	-	-	-

Performance Variable Model: TMRReward		
Top Level Model Information	Child Model Name	TMRModel
	Model Type	SAN Model

Performance Variable : p_safestate			
Affecting Models	TMRModel		
Impulse Functions			
Reward Function	*(Reward is over all Available Models)* if (TMRModel->SafeState->Mark()==1) return 1;		
Simulator Statistics	Type	Instant of Time	
	Options	Estimate Mean	
		Include Lower Bound on Interval Estimate	
		Include Upper Bound on Interval Estimate	
		Estimate out of Range Probabilities	
		Confidence Level is Relative	
	Parameters	Start Time	5000.0,15000.0,25000.0,35000.0,
	Confidence	Confidence Level	0.95
		Confidence Interval	0.1

Performance Variable : p_unsafestate			
Affecting Models	TMRModel		
Impulse Functions			
Reward Function	*(Reward is over all Available Models)* if (TMRModel->UnsafeState->Mark()==1) return 1;		
Simulator Statistics	Type	Instant of Time	
	Options	Estimate Mean	
		Include Lower Bound on Interval Estimate	
		Include Upper Bound on Interval Estimate	
		Estimate out of Range Probabilities	
		Confidence Level is Relative	
	Parameters	Start Time	5000.0,15000.0,25000.0,35000.0,
	Confidence	Confidence Level	0.95
		Confidence Interval	0.1

Performance Variable : p_safestate_steadystate		
Affecting Models	TMRModel	
Impulse Functions		
Reward Function	*(Reward is over all Available Models)* if (TMRModel->SafeState->Mark()==1) return 1;	
	Type	Steady State

Simulator Statistics	Options	Estimate Mean	
		Include Lower Bound on Interval Estimate	
		Include Upper Bound on Interval Estimate	
		Estimate out of Range Probabilities	
		Confidence Level is Relative	
	Parameters	Initial Transient	0.0
		Batch Size	1.0
	Confidence	Confidence Level	0.95
		Confidence Interval	0.1

Performance Variable : p_unsafestate_steadystate			
Affecting Models	TMRModel		
Impulse Functions			
Reward Function	*(Reward is over all Available Models)* if (TMRModel->UnsafeState->Mark()==1) return 1;		
Simulator Statistics	Type	Steady State	
	Options	Estimate Mean	
		Include Lower Bound on Interval Estimate	
		Include Upper Bound on Interval Estimate	
		Estimate out of Range Probabilities	
		Confidence Level is Relative	
	Parameters	Initial Transient	0.0
		Batch Size	1.0
	Confidence	Confidence Level	0.95
		Confidence Interval	0.1