

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 $fr_complex * (1-p_individual)$
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 $p_erratic$

Case Distributions	case 1 1-p_erratic case 2 p_erratic
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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 Voter->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	Manual	[0.01, 0.05, 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 Estimate Mean Include Lower Bound on Interval Estimate Options 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 Estimate Mean Include Lower Bound on Interval Estimate Options 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

	Estimate Mean
	Include Lower Bound on Interval Estimate
	Include Upper Bound on Interval Estimate
	Estimate out of Range Probabilities
	Confidence Level is Relative
Options	
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
		Estimate Mean
	Options	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

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