

Report of Experiment ExpC. 3-Symmetry: Replay.

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Abstract

This experiment tests exact replication and stochastic replication for xegaRun of R-package xega. In the experiment, the 3-symmetry problem is solved by grammar-based genetic programming for fixed seeding and for Rs system seeding (option replay of xegaRun).

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- Do we **always** solve the 3 symmetry problem?
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- Number of Generations of Treatments

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- Stochastic Replicability

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- Treatment BoolT1SGPreplayXIX

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- Treatment BoolT1SGPreplayZa
- Treatment BoolT1SGPreplayZb

6 C xega

Definitions

Exact replicability of a computational experiment means that the experiment produces in each trial **identical** numerical result.

Stochastic replicability of a computational experiment means that the experiment produces in each trial the same expected result.

Description of Experiment

The purpose of this computational experiment is to show the difference between **exact** and **stochastic** replicability of the experiment.

The **problem environment** is the 3-symmetry problem: Finding a boolean expression (with and, or, and not) which is TRUE for symmetric 3-bit strings.

The **solution method** is grammar-based genetic programming (option `algorithm="sgp"` of `xegaRun`). The **solver** used is `xegaRun` from the R-package `xega`.

The experiment consists of 4 treatments, two for each choice of seeding.

Common Parameters of Experiment ExpC

	Parameter	Value
Experiment		EC
Problem.Environment	3-Symmetry Problem	
Optimize	Minimize!	
Algorithm	sgp	
Max.Depth.of.DTs	7	
Grammar	AndOrNotTuned1.txt	
Evaluation.Method	Deterministic	
Execution.Model	MultiCore	
Verbose	0	
Semantics	byValue	
Report.Eval.Errors	TRUE	
Termination.Condition	AbsoluteError	
Termination.Eps	-0.1	
Worst.Fitness	-8	
Gene.Map	Bin2Dec	

Table: Common Parameters of Experiment ExpC (Part 1)

Common Parameters of Experiment ExpC

Parameter Value	
Init.Gene	InitGene
Codons	120
Codon.Precision	LCM
Population.Size	50
Max.Generations	100
Crossover.Rate	0.2
Mutation.Rate	0.4
IV.Crossover.Rate	Const
Crossover.Rate.2	0.4
IV.Mutation.Rate	Const
Mutation.Rate.2	0.8

Table: Common Parameters of Experiment ExpC (Part 2)

Parameters of Treatments of Experiment ExpC

	Treatment	Trials	Replay
1	BoolT1SGPreplayXIII	50	13
2	BoolT1SGPreplayXIX	50	19
3	BoolT1SGPreplayZa	100	0
4	BoolT1SGPreplayZb	100	0

Table: Parameters of Treatments of Experiment ExpC

The Production Table of Experiment ExpC

	LHS	RHS
1	<fe>	<f0>
2	<fe>	<f1>(<fe>)
3	<fe>	<f2>(<fe>,<fe>)
4	<fe>	OR(AND(<f0>,<f0>),AND(NOT(<f0>),NOT(<f0>)))
5	<f2>	OR
6	<f2>	AND
7	<f2>	OR
8	<f1>	NOT
9	<f0>	D1
10	<f0>	D2
11	<f0>	D3

Table: The Production Table of Experiment ExpC

Treatments 1 and 2 test the seeding of the random number generator in xegaRun:
Repetition of a treatment should produce exactly the same result.
But different seeds should lead to different results.
Treatments 3 and 4 use the system seed of the random number generator:
Repetitions produce random results.
We expect that for enough trials both treatments have the same mean performance.

Do we **always** solve the 3 symmetry problem?

Observation

In this experiment, the 3-symmetry problem is **always** correctly solved.

Evidence: In all trials of all treatments the optimal fitness of 0 was reached. See next table.

Do we **always** solve the 3 symmetry problem?

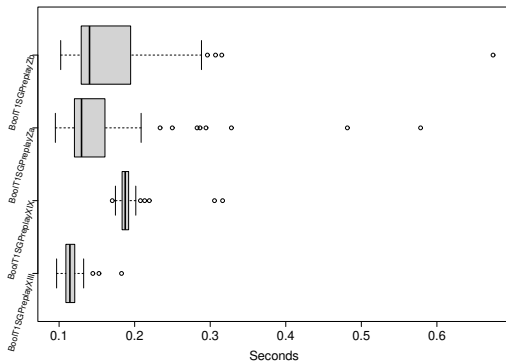
Fitness (Number of errors).

	Treatment	Trials	Variable	min	mean	sd	max
1	BoolT1SGPreplayXIII	50	Fitness	0.00	0.00	0.00	0.00
5	BoolT1SGPreplayXIX	50	Fitness	0.00	0.00	0.00	0.00
9	BoolT1SGPreplayZa	100	Fitness	0.00	0.00	0.00	0.00
13	BoolT1SGPreplayZb	100	Fitness	0.00	0.00	0.00	0.00

Table: Fitness (Number of errors).

Time of Treatments in Seconds

3-Symmetry: Replay.



Time of Treatments in Seconds

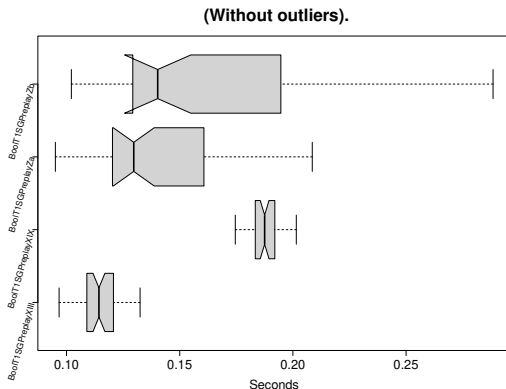
Time (s).

	Treatment	Trials	Variable	min	mean	sd	max
2	BoolT1SGPreplayXIII	50	Seconds	0.10	0.12	0.01	0.18
6	BoolT1SGPreplayXIX	50	Seconds	0.17	0.19	0.03	0.32
10	BoolT1SGPreplayZa	100	Seconds	0.10	0.18	0.11	0.75
14	BoolT1SGPreplayZb	100	Seconds	0.10	0.18	0.09	0.67

Table: Time (s).

Time of Treatments in Seconds

3-Symmetry: Replay.



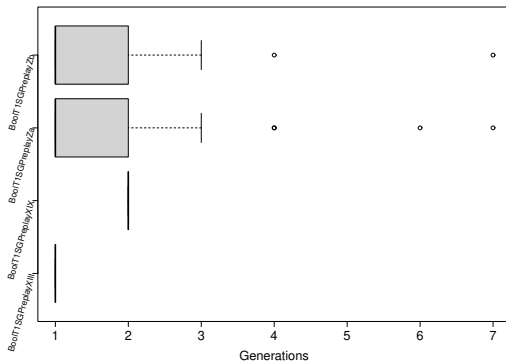
Conclusion

The execution time (in seconds) does not allow to identify deterministic results, because it may depend on other system activity e.g. I/O operations.

Evidence: The time variation in execution time for all treatments.

Number of Generations of Treatments

3-Symmetry: Replay.



Number of Generations of Treatments

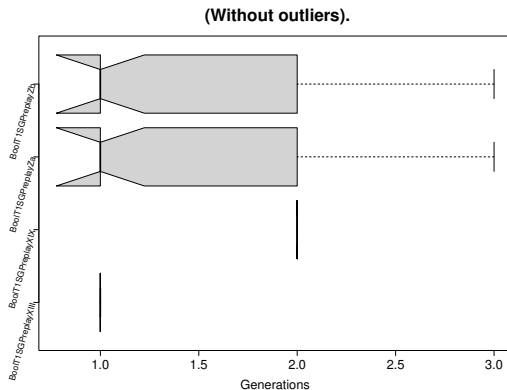
Generations

	Treatment	Trials	Variable	min	mean	sd	max
3	BoolT1SGPreplayXIII	50	Generations	1.00	1.00	0.00	1.00
7	BoolT1SGPreplayXIX	50	Generations	2.00	2.00	0.00	2.00
11	BoolT1SGPreplayZa	100	Generations	1.00	1.67	1.42	9.00
15	BoolT1SGPreplayZb	100	Generations	1.00	1.59	1.21	8.00

Table: Generations

Number of Generations of Treatments

3-Symmetry: Replay.



Observation

The number of generations needed allows to recognize randomness because of non-zero standard deviation.

The number of generations indicates determinism, if the standard deviation is 0.

Exact Replicability

Distribution of the variable Generations for repeated trials.

	Treatment	Trials	Variable	min	mean	sd	max
3	BoolT1SGPreplayXIII	50	Generations	1.00	1.00	0.00	1.00
7	BoolT1SGPreplayXIX	50	Generations	2.00	2.00	0.00	2.00

Table: Distribution of the variable Generations for repeated trials.

Result

Each treatment is deterministic.

Evidence:

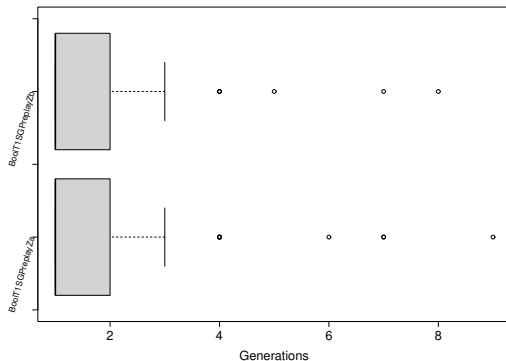
The standard deviation sd of each treatment is 0.00 (for any number of trials).

Only 1 solution is found by repeated trials.

Different seeds (may) result in different results: One treatment needs 1 generation, the other 2 generations to reach the optimum.

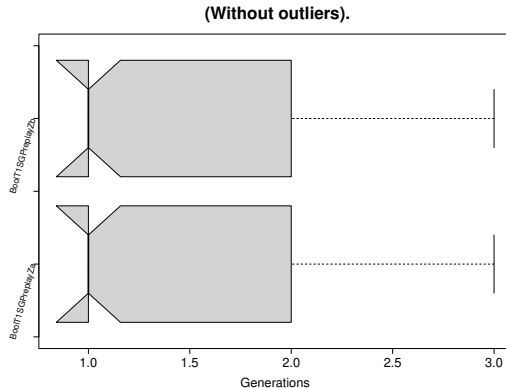
Stochastic Replicability

Comparing a treatment and its repetition. Hypothesis: Equal expected mean number of generations.



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Distribution of the variable Generations for repeated trials.

	Treatment	Trials	Variable	min	mean	sd	max
3	BoolT1SGPreplayZa	100	Generations	1.00	1.67	1.42	9.00
7	BoolT1SGPreplayZb	100	Generations	1.00	1.59	1.21	8.00

Table: Distribution of the variable Generations for repeated trials.

Is variable Generations of treatment BoolT1SGPreplayZa normal?

Normality Test. The normality of variable Generations of treatment BoolT1SGPreplayZa of experiment ExpC is tested at a significance level 0.05.

Outliers are not removed (coef=0).

The test-statistic W of the Shapiro-Wilk normality test is 0.541 with a p-value of 0 . Since the p-value 0 is below or equal the significance level $\alpha = 0.05$, variable **Generations** of treatment **BoolT1SGPreplayZa** of experiment ExpC is **significantly different** from a normal distribution.

Is variable Generations of treatment BoolT1SGPreplayZb normal?

Normality Test. The normality of variable Generations of treatment BoolT1SGPreplayZb of experiment ExpC is tested at a significance level 0.05.

Outliers are not removed (coef=0).

The test-statistic W of the Shapiro-Wilk normality test is 0.554 with a p-value of 0 . Since the p-value 0 is below or equal the significance level $\alpha = 0.05$, variable **Generations** of treatment **BoolT1SGPreplayZb** of experiment ExpC is **significantly different** from a normal distribution.

Because of the non-normality of variable Generations a two sample Wilcoxon test is used for comparing the means of the variable Generations of the treatments.

Stochastic Replicability

Test of H_0 : Means of treatments BoolT1SGPreplayZa and BoolT1SGPreplayZb of variable Generations are equal.

For variable Generations of treatments BoolT1SGPreplayZa and BoolT1SGPreplayZb of experiment ExpC:

Hypothesis 0: mean(Generations of BoolT1SGPreplayZa) - mean(Generations of BoolT1SGPreplayZb) is equal to 0.

is tested at a significance level 0.05 against:

Hypothesis 1: mean(Generations of BoolT1SGPreplayZa) - mean(Generations of BoolT1SGPreplayZb) is not equal to 0.

Outliers of treatment BoolT1SGPreplayZa are not removed (coef=0).

Outliers of treatment BoolT1SGPreplayZb are not removed (coef=0).

The test-statistic W of the Wilcoxon rank sum test with continuity correction is 4998 with a p-value of 0.995 . Since the p-value 0.995 is above the significance level $\alpha = 0.05$, for variable Generations of treatments BoolT1SGPreplayZa and BoolT1SGPreplayZb of experiment ExpC **Hypothesis 0:** mean(Generations of BoolT1SGPreplayZa) - mean(Generations of BoolT1SGPreplayZb) is equal to 0. is **accepted**.

Is variable Generations of treatment BoolT1SGPreplayZa normal?

Normality Test. The normality of variable Generations of treatment BoolT1SGPreplayZa of experiment ExpC is tested at a significance level 0.05.

8 outliers removed (coef=1.5).

The test-statistic W of the Shapiro-Wilk normality test is 0.543 with a p-value of 0 . Since the p-value 0 is below or equal the significance level $\alpha = 0.05$, variable **Generations** of treatment **BoolT1SGPreplayZa** of experiment ExpC is **significantly different** from a normal distribution.

Is variable Generations of treatment BoolT1SGPreplayZb normal?

Normality Test. The normality of variable Generations of treatment BoolT1SGPreplayZb of experiment ExpC is tested at a significance level 0.05.

6 outliers removed (coef=1.5).

The test-statistic W of the Shapiro-Wilk normality test is 0.576 with a p-value of 0 . Since the p-value 0 is below or equal the significance level $\alpha = 0.05$, variable **Generations** of treatment **BoolT1SGPreplayZb** of experiment ExpC is **significantly different** from a normal distribution.

Because of the non-normality of variable Generations a two sample Wilcoxon test is used for comparing the means of the variable Generations of the treatments.

Stochastic Replicability

Test of H_0 : Means of treatments BoolT1SGPreplayZa and BoolT1SGPreplayZb of variable Generations are equal.

For variable Generations of treatments BoolT1SGPreplayZa and BoolT1SGPreplayZb of experiment ExpC:

Hypothesis 0: mean(Generations of BoolT1SGPreplayZa) - mean(Generations of BoolT1SGPreplayZb) is equal to 0.

is tested at a significance level 0.05 against:

Hypothesis 1: mean(Generations of BoolT1SGPreplayZa) - mean(Generations of BoolT1SGPreplayZb) is not equal to 0.

8 outliers of treatment BoolT1SGPreplayZa are removed (coef=1.5).

6 outliers of treatment BoolT1SGPreplayZb are removed (coef=1.5).

The test-statistic W of the Wilcoxon rank sum test with continuity correction is 4220 with a p-value of 0.708 . Since the p-value 0.708 is above the significance level $\alpha = 0.05$, for variable Generations of treatments BoolT1SGPreplayZa and BoolT1SGPreplayZb of experiment ExpC **Hypothesis 0:** mean(Generations of BoolT1SGPreplayZa) - mean(Generations of BoolT1SGPreplayZb) is equal to 0. is **accepted**.

Result

Each treatment produces a sample drawn from the **same** random process.

Evidence:

The standard deviation sd of each treatment is **not** 0.00 (for any number of trials).

The treatments find 14 and 17 **different, but equivalent** boolean expressions. (See solution tables in section B Treatments.)

Different seeds (may) result in **different samples**:

The hypothesis test **supports** the conjecture that the sample means of the variable Generations of the treatments are equal.

This implies that the two treatments come from the same random process.

Summary of statistics of experiment ExpC.

	Treatment	Trials	Variable	min	mean	sd	max
4	BoolT1SGPreplayXIII	50	Evaluations	50.00	50.00	0.00	50.00
8	BoolT1SGPreplayXIX	50	Evaluations	100.00	100.00	0.00	100.00
12	BoolT1SGPreplayZa	100	Evaluations	50.00	83.50	71.09	450.00
16	BoolT1SGPreplayZb	100	Evaluations	50.00	79.50	60.34	400.00
1	BoolT1SGPreplayXIII	50	Fitness	0.00	0.00	0.00	0.00
5	BoolT1SGPreplayXIX	50	Fitness	0.00	0.00	0.00	0.00
9	BoolT1SGPreplayZa	100	Fitness	0.00	0.00	0.00	0.00
13	BoolT1SGPreplayZb	100	Fitness	0.00	0.00	0.00	0.00
3	BoolT1SGPreplayXIII	50	Generations	1.00	1.00	0.00	1.00
7	BoolT1SGPreplayXIX	50	Generations	2.00	2.00	0.00	2.00
11	BoolT1SGPreplayZa	100	Generations	1.00	1.67	1.42	9.00
15	BoolT1SGPreplayZb	100	Generations	1.00	1.59	1.21	8.00
2	BoolT1SGPreplayXIII	50	Seconds	0.10	0.12	0.01	0.18
6	BoolT1SGPreplayXIX	50	Seconds	0.17	0.19	0.03	0.32
10	BoolT1SGPreplayZa	100	Seconds	0.10	0.18	0.11	0.75

Table: Summary of statistics of experiment ExpC. (Part 1)

Summary of statistics of experiment ExpC.

	Treatment	Trials	Variable	min	mean	sd	max
14	BoolT1SGPreplayZb	100	Seconds	0.10	0.18	0.09	0.67

Table: Summary of statistics of experiment ExpC. (Part 2)

Treatment BoolT1SGPreplayXIII

Parameters of treatment: BoolT1SGPreplayXIII

Parameter Values	
tRNG	L'Ecuyer-CMRG Inversion Rejection
tReplay	0
experimentName	EC
treatmentName	BoolT1SGPreplayXIII
trials	50
everyK	10
outpath	data
batchPath	.
tVerbose	1

Table: Parameters of treatment: BoolT1SGPreplayXIII

Treatment BoolT1SGPreplayXIII

Parameters of treatment BoolT1SGPreplayXIII passed to xegaRun

		Parameter Values
penv		3-Symmetry Problem
grammar	/home/dj2333/dev/cran/kSymmetry/BNF/AndOrNotTuned1.txt	
replay		13
algorithm		sgp
maxdepth		7
max		FALSE
worstFitness		-8
popsiz		50
generations		100
crossrate		0.2
mutrate		0.4
ivmutrate		Const
mutrate2		0.8
ivcrossrate		Const
crossrate2		0.4

Table: Parameters of treatment BoolT1SGPreplayXIII passed to xegaRun
(Part 1)

Treatment BoolT1SGPreplayXIII

Parameters of treatment BoolT1SGPreplayXIII passed to xegaRun

Parameter Values	
scalefactor	Uniform
genemap	Bin2Dec
initgene	InitGene
selection	SUS
mateselection	SUS
replication	Kid2
crossover	Cross2Gene
mutation	MutateGene
accept	All
reportEvalErrors	TRUE
codons	120
codonPrecision	LCM
terminationEps	-0.1
terminationCondition	AbsoluteError
evalmethod	Deterministic

Table: Parameters of treatment BoolT1SGPreplayXIII passed to xegaRun
(Part 2)

Treatment BoolT1SGPreplayXIII

Parameters of treatment BoolT1SGPreplayXIII passed to xegaRun

	Parameter Values
executionModel	MultiCore
verbose	0
batch	FALSE
semantics	byValue
path	.

Table: Parameters of treatment BoolT1SGPreplayXIII passed to xegaRun (Part 3)

Treatment BoolT1SGPreplayXIII

Treatment: BoolT1SGPreplayXIII

	Treatment	Trials	Variable	min	mean	sd	max
4	BoolT1SGPreplayXIII	50	Evaluations	50.00	50.00	0.00	50.00
1	BoolT1SGPreplayXIII	50	Fitness	0.00	0.00	0.00	0.00
3	BoolT1SGPreplayXIII	50	Generations	1.00	1.00	0.00	1.00
2	BoolT1SGPreplayXIII	50	Seconds	0.10	0.12	0.01	0.18

Table: Treatment: BoolT1SGPreplayXIII

Treatment BoolT1SGPreplayXIII

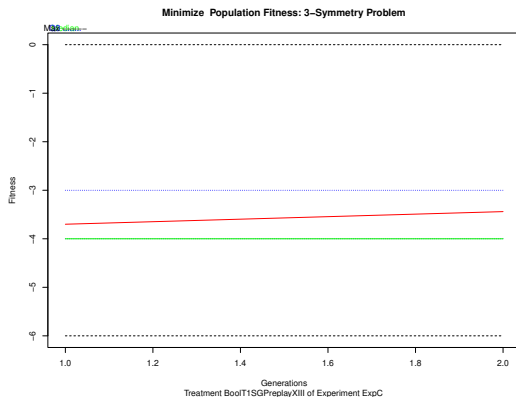
The Solution Table of Treatment BoolT1SGPreplayXIII of Experiment ExpC. Fit: 0.
Unique Shortest Solutions: 1.

Solution	
1	$\text{OR}(\text{AND}(\text{D1}, \text{D3}), \text{AND}(\text{NOT}(\text{D1}), \text{NOT}(\text{D3})))$

Table: The Solution Table of Treatment BoolT1SGPreplayXIII of
Experiment ExpC. Fit: 0. Unique Shortest Solutions: 1.

Treatment BoolT1SGPreplayXIII

Plot of last xegaRun for Treatment BoolT1SGPreplayXIII of Experiment ExpC



Treatment BoolT1SGPreplayXIX

Parameters of treatment: BoolT1SGPreplayXIX

Parameter Values	
tRNG	L'Ecuyer-CMRG Inversion Rejection
tReplay	0
experimentName	EC
treatmentName	BoolT1SGPreplayXIX
trials	50
everyK	10
outpath	data
batchPath	.
tVerbose	1

Table: Parameters of treatment: BoolT1SGPreplayXIX

Treatment BoolT1SGPreplayXIX

Parameters of treatment BoolT1SGPreplayXIX passed to xegaRun

		Parameter Values
penv	3-Symmetry Problem	
grammar	/home/dj2333/dev/cran/kSymmetry/BNF/AndOrNotTuned1.txt	
replay	19	
algorithm	sgp	
maxdepth	7	
max	FALSE	
worstFitness	-8	
popsiz	50	
generations	100	
crossrate	0.2	
mutrate	0.4	
ivmutrate	Const	
mutrate2	0.8	
ivcrossrate	Const	
crossrate2	0.4	

Table: Parameters of treatment BoolT1SGPreplayXIX passed to xegaRun
(Part 1)

Treatment BoolT1SGPreplayXIX

Parameters of treatment BoolT1SGPreplayXIX passed to xegaRun

Parameter Values	
scalefactor	Uniform
genemap	Bin2Dec
initgene	InitGene
selection	SUS
mateselection	SUS
replication	Kid2
crossover	Cross2Gene
mutation	MutateGene
accept	All
reportEvalErrors	TRUE
codons	120
codonPrecision	LCM
terminationEps	-0.1
terminationCondition	AbsoluteError
evalmethod	Deterministic

Table: Parameters of treatment BoolT1SGPreplayXIX passed to xegaRun
(Part 2)

Treatment BoolT1SGPreplayXIX

Parameters of treatment BoolT1SGPreplayXIX passed to xegaRun

Parameter Values	
executionModel	MultiCore
verbose	0
batch	FALSE
semantics	byValue
path	.

Table: Parameters of treatment BoolT1SGPreplayXIX passed to xegaRun (Part 3)

Treatment BoolT1SGPreplayXIX

Treatment: BoolT1SGPreplayXIX

	Treatment	Trials	Variable	min	mean	sd	max
8	BoolT1SGPreplayXIX	50	Evaluations	100.00	100.00	0.00	100.00
5	BoolT1SGPreplayXIX	50	Fitness	0.00	0.00	0.00	0.00
7	BoolT1SGPreplayXIX	50	Generations	2.00	2.00	0.00	2.00
6	BoolT1SGPreplayXIX	50	Seconds	0.17	0.19	0.03	0.32

Table: Treatment: BoolT1SGPreplayXIX

Treatment BoolT1SGPreplayXIX

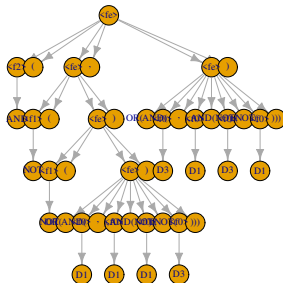
The Solution Table of Treatment BoolT1SGPreplayXIX of Experiment ExpC. Fit: 0.
Unique Shortest Solutions: 1.

Solution	
1	$\text{AND}(\text{NOT}(\text{NOT}(\text{OR}(\text{AND}(\text{D1}, \text{D1}), \text{AND}(\text{NOT}(\text{D1}), \text{NOT}(\text{D3}))))), \text{OR}(\text{AND}(\text{D3}, \text{D1}), \text{AND}(\text{NOT}(\text{D3}), \text{NOT}(\text{D1}))))$

Table: The Solution Table of Treatment BoolT1SGPreplayXIX of Experiment ExpC. Fit: 0. Unique Shortest Solutions: 1.

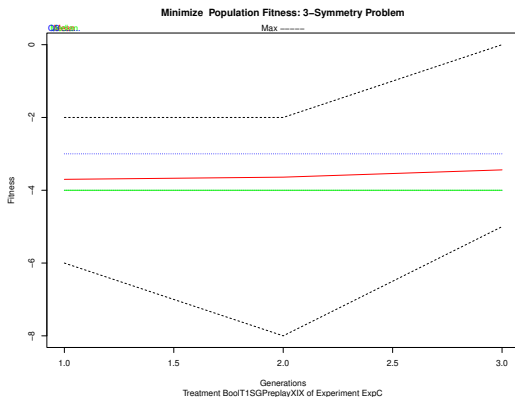
Treatment BoolT1SGPreplayXIX

The Derivation Tree of a Solution of Treatment BoolT1SGPreplayXIX of Experiment ExpC



Treatment BoolT1SGPreplayXIX

Plot of last xegaRun for Treatment BoolT1SGPreplayXIX of Experiment ExpC



Treatment BoolT1SGPreplayZa

Parameters of treatment: BoolT1SGPreplayZa

Parameter Values	
tRNG	L'Ecuyer-CMRG Inversion Rejection
tReplay	0
experimentName	EC
treatmentName	BoolT1SGPreplayZa
trials	100
everyK	10
outpath	data
batchPath	.
tVerbose	1

Table: Parameters of treatment: BoolT1SGPreplayZa

Treatment BoolT1SGPreplayZa

Parameters of treatment BoolT1SGPreplayZa passed to xegaRun

		Parameter Values
penv	3-Symmetry Problem	
grammar	/home/dj2333/dev/cran/kSymmetry/BNF/AndOrNotTuned1.txt	
replay	0	
algorithm	sgp	
maxdepth	7	
max	FALSE	
worstFitness	-8	
popsiz	50	
generations	100	
crossrate	0.2	
mutrate	0.4	
ivmutrate	Const	
mutrate2	0.8	
ivcrossrate	Const	
crossrate2	0.4	

Table: Parameters of treatment BoolT1SGPreplayZa passed to xegaRun
(Part 1)

Treatment BoolT1SGPreplayZa

Parameters of treatment BoolT1SGPreplayZa passed to xegaRun

Parameter Values	
scalefactor	Uniform
genemap	Bin2Dec
initgene	InitGene
selection	SUS
mateselection	SUS
replication	Kid2
crossover	Cross2Gene
mutation	MutateGene
accept	All
reportEvalErrors	TRUE
codons	120
codonPrecision	LCM
terminationEps	-0.1
terminationCondition	AbsoluteError
evalmethod	Deterministic

Table: Parameters of treatment BoolT1SGPreplayZa passed to xegaRun
(Part 2)

Treatment BoolT1SGPreplayZa

Parameters of treatment BoolT1SGPreplayZa passed to xegaRun

	Parameter Values
executionModel	MultiCore
verbose	0
batch	FALSE
semantics	byValue
path	.

Table: Parameters of treatment BoolT1SGPreplayZa passed to xegaRun
(Part 3)

Treatment BoolT1SGPreplayZa

Treatment: BoolT1SGPreplayZa

	Treatment	Trials	Variable	min	mean	sd	max
12	BoolT1SGPreplayZa	100	Evaluations	50.00	83.50	71.09	450.00
9	BoolT1SGPreplayZa	100	Fitness	0.00	0.00	0.00	0.00
11	BoolT1SGPreplayZa	100	Generations	1.00	1.67	1.42	9.00
10	BoolT1SGPreplayZa	100	Seconds	0.10	0.18	0.11	0.75

Table: Treatment: BoolT1SGPreplayZa

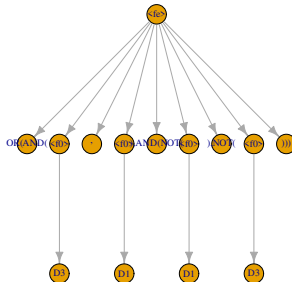
Treatment BoolT1SGPreplayZa

The Solution Table of Treatment BoolT1SGPreplayZa of Experiment ExpC. Fit: 0.
Unique Shortest Solutions: 14.

Solution	
1	OR(AND(D1, D3), AND(NOT(D1), NOT(D3)))

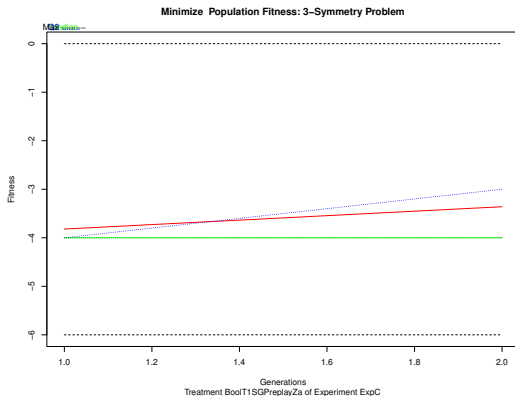
Table: The Solution Table of Treatment BoolT1SGPreplayZa of
Experiment ExpC. Fit: 0. Unique Shortest Solutions: 14.

Treatment BoolT1SGPreplayZa



Treatment BoolT1SGPreplayZa

Plot of last xegaRun for Treatment BoolT1SGPreplayZa of Experiment ExpC



Treatment BoolT1SGPreplayZb

Parameters of treatment: BoolT1SGPreplayZb

Parameter Values	
tRNG	L'Ecuyer-CMRG Inversion Rejection
tReplay	0
experimentName	EC
treatmentName	BoolT1SGPreplayZb
trials	100
everyK	10
outpath	data
batchPath	.
tVerbose	1

Table: Parameters of treatment: BoolT1SGPreplayZb

Treatment BoolT1SGPreplayZb

Parameters of treatment BoolT1SGPreplayZb passed to xegaRun

		Parameter Values
penv	3-Symmetry Problem	
grammar	/home/dj2333/dev/cran/kSymmetry/BNF/AndOrNotTuned1.txt	
replay	0	
algorithm	sgp	
maxdepth	7	
max	FALSE	
worstFitness	-8	
popsiz	50	
generations	100	
crossrate	0.2	
mutrate	0.4	
ivmutrate	Const	
mutrate2	0.8	
ivcrossrate	Const	
crossrate2	0.4	

Table: Parameters of treatment BoolT1SGPreplayZb passed to xegaRun
(Part 1)

Treatment BoolT1SGPreplayZb

Parameters of treatment BoolT1SGPreplayZb passed to xegaRun

	Parameter Values
scalefactor	Uniform
genemap	Bin2Dec
initgene	InitGene
selection	SUS
mateselection	SUS
replication	Kid2
crossover	Cross2Gene
mutation	MutateGene
accept	All
reportEvalErrors	TRUE
codons	120
codonPrecision	LCM
terminationEps	-0.1
terminationCondition	AbsoluteError
evalmethod	Deterministic

Table: Parameters of treatment BoolT1SGPreplayZb passed to xegaRun
(Part 2)

Treatment BoolT1SGPreplayZb

Parameters of treatment BoolT1SGPreplayZb passed to xegaRun

	Parameter Values
executionModel	MultiCore
verbose	0
batch	FALSE
semantics	byValue
path	.

Table: Parameters of treatment BoolT1SGPreplayZb passed to xegaRun
(Part 3)

Treatment BoolT1SGPreplayZb

Treatment: BoolT1SGPreplayZb

	Treatment	Trials	Variable	min	mean	sd	max
16	BoolT1SGPreplayZb	100	Evaluations	50.00	79.50	60.34	400.00
13	BoolT1SGPreplayZb	100	Fitness	0.00	0.00	0.00	0.00
15	BoolT1SGPreplayZb	100	Generations	1.00	1.59	1.21	8.00
14	BoolT1SGPreplayZb	100	Seconds	0.10	0.18	0.09	0.67

Table: Treatment: BoolT1SGPreplayZb

Treatment BoolT1SGPreplayZb

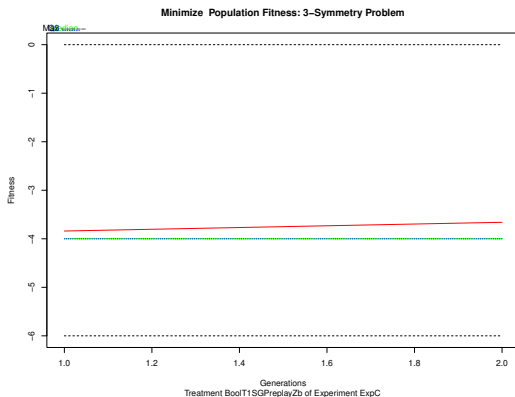
The Solution Table of Treatment BoolT1SGPreplayZb of Experiment ExpC. Fit: 0.
Unique Shortest Solutions: 17.

Solution	
1	OR(AND(D3, D1), AND(NOT(D3), NOT(D1)))

Table: The Solution Table of Treatment BoolT1SGPreplayZb of
Experiment ExpC. Fit: 0. Unique Shortest Solutions: 17.

Treatment BoolT1SGPreplayZb

Plot of last xegaRun for Treatment BoolT1SGPreplayZb of Experiment ExpC



All parameters of xegaRun of treatment BoolT1SGPreplayXIII

		Parameter Values
penv		3-Symmetry Problem
grammar	/home/dj2333/dev/cran/kSymmetry/BNF/AndOrNotTuned1.txt	
max		FALSE
algorithm		sgp
popsiz		50
generations		100
crossrate		0.2
mutrate		0.4
elitist		TRUE
replay		13
maxdepth		7
maxtrials		5
codons		120
codonBits		0
codonPrecision		LCM

Table: All parameters of xegaRun of treatment BoolT1SGPreplayXIII
(Part 1)

All parameters of xegaRun of treatment BoolT1SGPreplayXIII

Parameter Values	
maxPBias	0.01
evalmethod	Deterministic
evalrep	1
reportEvalErrors	TRUE
genemap	Bin2Dec
decoder	DecodeGene
crossrate2	0.4
ivcrossrate	Const
crossover	Cross2Gene
uCrossSwap	0.2
mincrossdepth	1
maxcrossdepth	7
ivmutrate	Const
mutrate2	0.8
bitmutrate	0.005

Table: All parameters of xegaRun of treatment BoolT1SGPreplayXIII
(Part 2)

All parameters of xegaRun of treatment BoolT1SGPreplayXIII

Parameter Values	
bitmutrate2	0.01
maxmutdepth	3
minmutinsertiondepth	1
maxmutinsertiondepth	7
lambda	0.05
max2opt	100
scalefactor1	0.9
scalefactor2	0.3
scalefactor	Uniform
cutoffFit	0.5
mutation	MutateGene
replication	Kid2
initgene	InitGene
offset	1
eps	0.01

Table: All parameters of xegaRun of treatment BoolT1SGPreplayXIII
(Part 3)

All parameters of xegaRun of treatment BoolT1SGPreplayXIII

Parameter Values	
tournamentSize	2
selectionBias	1.5
maxTSR	1.5
selection	SUS
mateselection	SUS
selectionContinuation	TRUE
scaling	NoScaling
scalingThreshold	0
scalingExp	1
scalingExp2	1
rdmWeight	1
drMax	2
drMin	0.5
dispersionMeasure	var
scalingDelay	1

Table: All parameters of xegaRun of treatment BoolT1SGPreplayXIII
(Part 4)

All parameters of xegaRun of treatment BoolT1SGPreplayXIII

Parameter Values	
accept	All
alpha	0.99
beta	2
cooling	ExponentialMultiplicative
coolingPower	1
temp0	40
tempN	0.01
verbose	0
logevals	FALSE
allsolutions	FALSE
early	FALSE
terminationCondition	AbsoluteError
terminationEps	-0.1
terminationThreshold	0
worstFitness	-8

Table: All parameters of xegaRun of treatment BoolT1SGPreplayXIII
(Part 5)

All parameters of xegaRun of treatment BoolT1SGPreplayXIII

Parameter Values	
PACdelta	0.01
fSpace	Hilbert
cores	
executionModel	MultiCore
uParApply	NULL
Cluster	NULL
profile	FALSE
batch	FALSE
path	.
semantics	byValue

Table: All parameters of xegaRun of treatment BoolT1SGPreplayXIII (Part 6)