Correction to: Evolutionary Computation in Combinatorial Optimization

Arnaud Liefooghe and Luís Paquete

Correction to:
A. Liefooghe and L. Paquete (Eds.): *Evolutionary Computation in Combinatorial Optimization*, LNCS 11452, https://doi.org/10.1007/978-3-030-16711-0

1. Chapter 6.
In the originally published version the indexes of some variables in Section 4.1, including Constraints (4) and (5) of the model, include a wrong offset of one position. Some errors occurred in notations of variable indexes in Constraints (4) and (5) conditions of the model in Section 4.1, together with some ambiguities that may lead to misunderstanding for the reader. This was corrected in the updated version.

2. Chapter 11.
The originally published version of the paper "Clarifying the Difference in Local Optima Network Sampling Algorithms" contained an error. The additional text correcting the error has been added below.

Summary
During a re-analysis of the data-set, the lead author realised that she had made analytical errors while computing the results for this paper. This erratum presents the corrected numeric results in Section 3. These correspond to Tables 3 and 4 and Figures 2 and 3 — all of which are from Section 4.2 in the original paper. This report discusses the affect on the main conclusions of the work in the next Section. We found that while the numeric results are changed, most of the conclusions are still generally correct.

Affect on Conclusions
Conclusion 1. We found that the two sampling methods exhibited some agreement in the networks they produced and that we could reject the null hypothesis that they produce completely independent samples. They differed from a descriptive perspective in that *walkSample* was tuneable and predictable, while *optSample* varied widely but

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seemed good at finding hub-and-spoke structure in the local optima space. **This conclusion is still correct.**

Conclusion 2. The correlations were stronger and clear when considering the features of the LONs obtained using *optSample* than *walkSample*. **This conclusion is still correct.**

Conclusion 3. We also worked on explaining heuristic algorithm performance on the problems using linear and random forest models, and found that the sampled LON features (for both *optSample* and *walkSample*) better fit the ILS response variable than the TS one. **This conclusion is now reversed**, i.e., the sampled LON features better fit the TS response variable than the ILS one.

Conclusion 4. We saw that generally, including both the funnel metric set and the network set would be advantageous in explaining search discrepancies for these two heuristics. **This conclusion is still correct.**

Conclusion 5. For both *optSample* and *walkSample*, the extracted funnel metrics proved useful. **This conclusion is still correct with a nuance**, i.e. the extracted funnel metrics proved useful with respect to TS as a response variable.

Conclusion 6. Going off the random forest models alone, *optSample* uniformly had more predictive power than its competitor, for these choices of instances and heuristics. **This conclusion is still correct overall**; *optSample* generally had more predictive power, but not uniformly.

Conclusion 7. From the random forest rankings, the most important predictors were those pertaining to fitness in the sampled networks: the fitness of funnel bottoms, and of nodes in general in the network. This hints that perhaps fitness levels in the local optima space are more pertinent to heuristic search than the subset of transition edges sampled by the LON algorithms. **This conclusion is still correct.**

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Corrected Results

Table 1. Corrected results for Table 3 in the original paper. R^2 values for linear and random forest models to explain heuristic performance variation on the combinatorial problems.

Sample	Model	Features	Param.	ILS	TS
optSample	lm	all	set 1	0.124	0.963
optSample	lm	all	set 2	0.135	0.963
optSample	lm	all	set 3	0.182	0.964
optSample	lm	all	set 4	0.109	0.974
optSample	lm	funnel	set 1	0.114	0.125
optSample	lm	funnel	set 2	0.117	0.124

(*continued*)

Table 1. (*continued*)

Sample	Model	Features	Param.	ILS	TS
optSample	lm	funnel	set 3	0.162	0.127
optSample	lm	funnel	set 4	0.094	0.125
optSample	lm	network	set 1	0.069	0.957
optSample	lm	network	set 2	0.065	0.957
optSample	lm	network	set 3	0.075	0.958
optSample	lm	network	set 4	0.061	0.954
optSample	rf	all	set 4	0.307	0.820
optSample	rf	funnel	set 4	0.216	0.892
optSample	rf	network	set 4	0.247	0.775
walkSample	lm	all	set 1	0.640	0.980
walkSample	lm	all	set 2	0.339	0.955
walkSample	lm	all	set 3	0.294	0.964
walkSample	lm	all	set 4	0.158	0.968
walkSample	lm	funnel	set 1	0.200	0.956
walkSample	lm	funnel	set 2	0.104	0.946
walkSample	lm	funnel	set 3	0.086	0.954
walkSample	lm	funnel	set 4	0.061	0.901
walkSample	lm	network	set 1	0.062	0.027
walkSample	lm	network	set 2	0.245	0.042
walkSample	lm	network	set 3	0.248	0.117
walkSample	lm	network	set 4	0.112	0.016
walkSample	rf	all	set 4	0.045	0.910
walkSample	rf	funnel	set 4	−0.017	0.632
walkSample	rf	network	set 4	−0.084	0.249

Table 2. Corrected results for Table 4 in the original paper. Predictor rankings for the random forest models.

Sample	Features	Param	Resp.	1	2	3	4
optSample	funnel	set 4	ILS	sinkfitness	substrength	funnel	ncoptima
optSample	network	set 4	ILS	meanfitness	edges	outdegree	diameter
optSample	all	set 4	ILS	meanfitness	sinkfitness	ncoptima	funnel
walkSample	funnel	set 4	ILS	sinkfitness	ncoptima	funnel	substrength
walkSample	network	set 4	ILS	meanfitness	outdegree	edges	diameter
walkSample	all	set 4	ILS	outdegree	meanfitness	sinkfitness	ncoptima
optSample	funnel	set 4	TS	sinkfitness	ncoptima	funnel	substrength
optSample	network	set 4	TS	meanfitness	edges	diameter	outdegree
optSample	all	set 4	TS	sinkfitness	meanfitness	substrength	funnel
walkSample	funnel	set 4	TS	substrength	funnel	sinkfitness	ncoptima
walkSample	network	set 4	TS	meanfitness	outdegree	diameter	edges
walkSample	all	set 4	TS	sinkfitness	meanfitness	outdegree	ncoptima

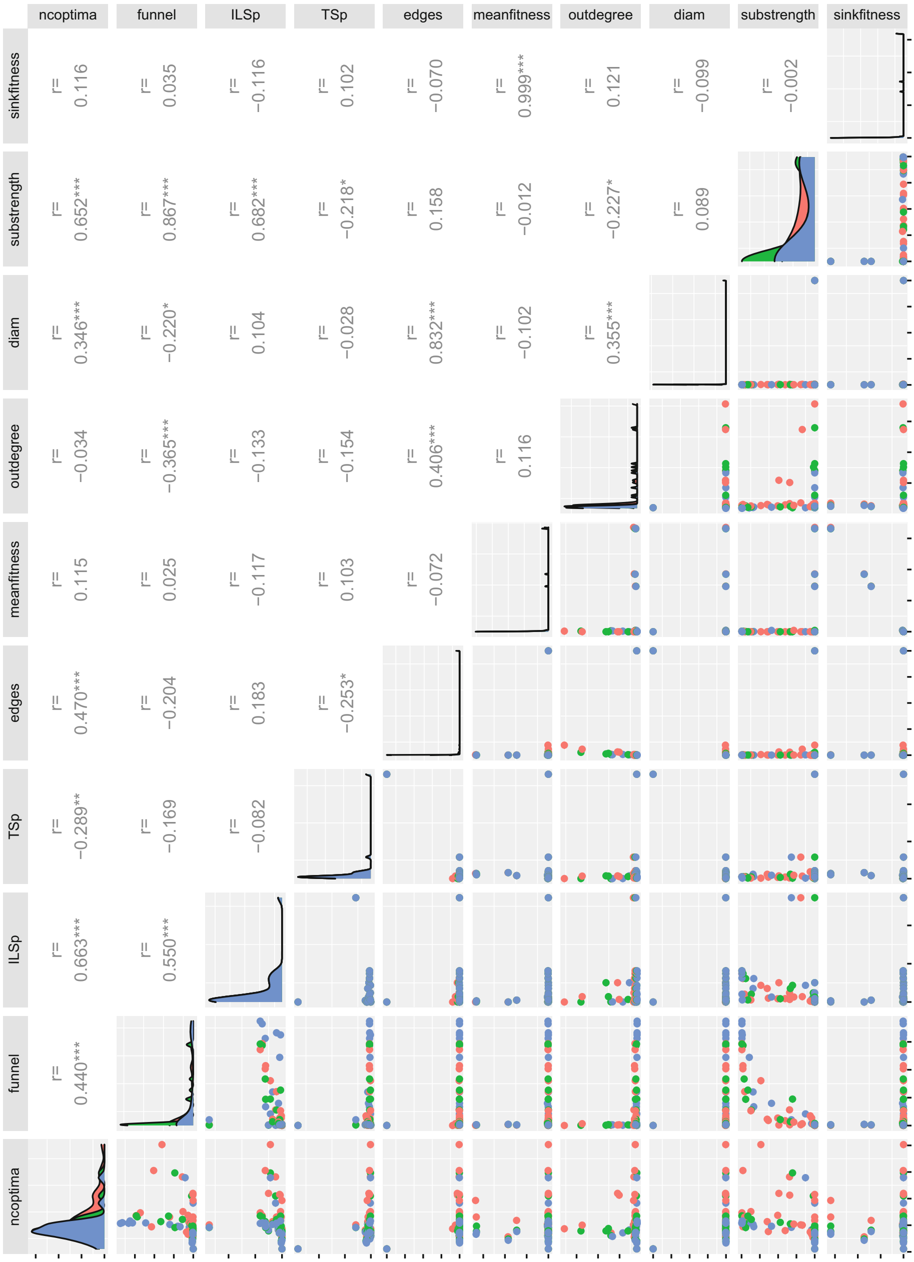

Fig. 1. Corrected results for Figure 2 in the original paper. Correlation matrix of performance metrics and *optSample*-produced LON features. Lower triangle: pairwise scatter plots. Diagonal: density plots. Upper triangle: pairwise Spearman's rank correlation, $^{***}p<0.001$, $^{**}p<0.01$, $^{*}p<0.05$.

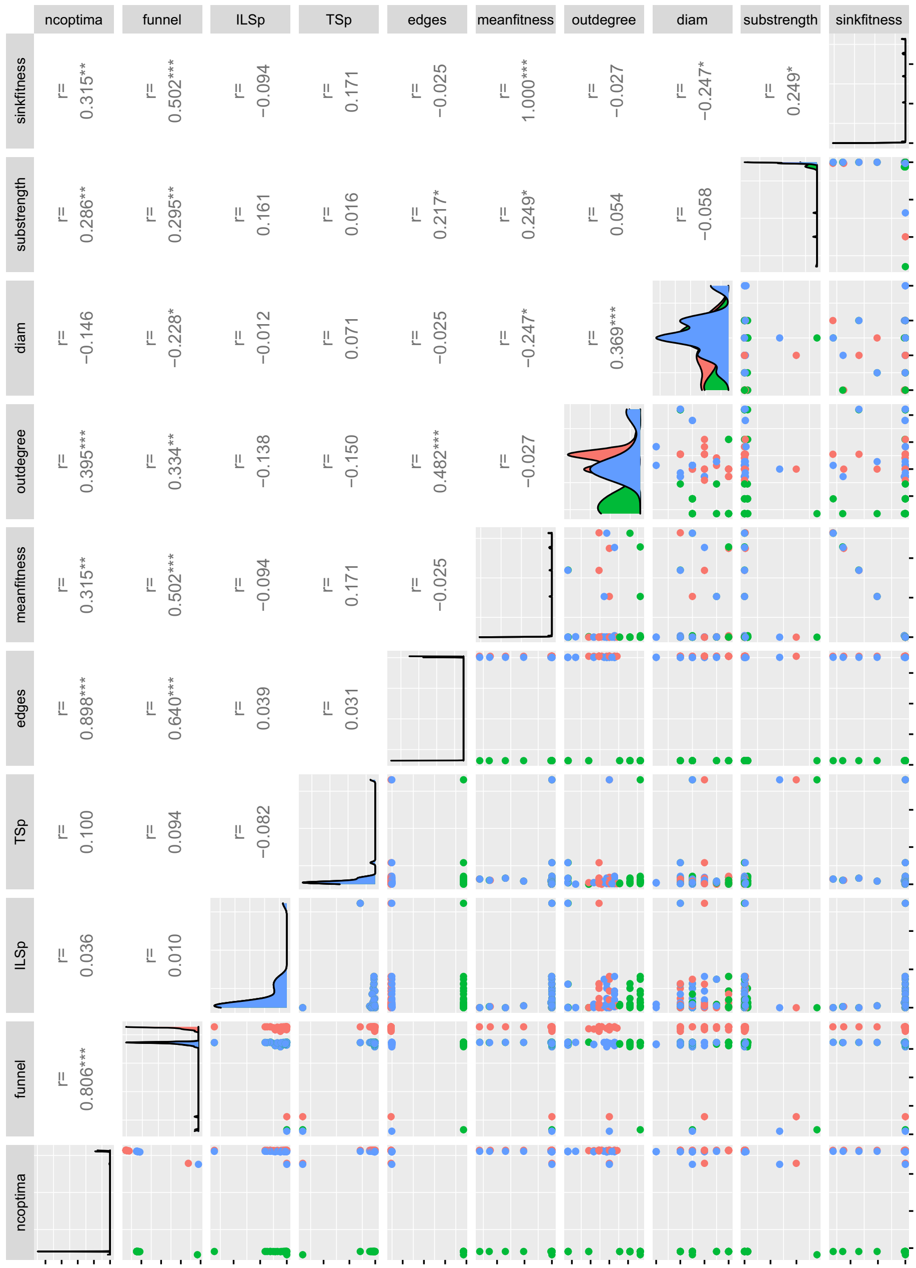

Fig. 2. Corrected results for Figure 3 in the original paper. Correlation matrix of performance metrics and *walkSample*-produced LON features. Lower triangle: pairwise scatter plots. Diagonal: density plots. Upper triangle: pairwise Spearman's rank correlation, $^{***}p<0.001$, $^{**}p<0.01$, $^{*}p<0.05$.