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CORRIGENDUM

Transit passenger-oriented optimisation of arrival aircraft sequencing – CORRIGENDUM

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The author wishes to provide the below corrigendum to the published version of their piece:

After reviewing rounds, with suggestion of the reviewers, I decided to use different approach speeds based on aircraft weight categories. I updated the related equations in the model but, I noticed that I have forgotten to add constraints which have been required after speed changes for using runway among arrival aircraft. With this document, you may find the additional constraints that have been required after using varying speeds rather than constant speeds on approach and updated results after this modification.

$$landingtime_i = mpt_i + durmptfaf + \left(\frac{dist}{vfaf_o} * ct\right), \; fmode_i = 1, \; \forall i \in I, \forall o \in O$$

$$landingtime_{i2} - landingtime_{i1} \geqslant csarr_{o1,o2} - M* \left(1 - y2_{i1,i2}\right),$$

$$i1 \neq i2, \; o1 = cat_{i1,} \, o2 = cat_{i2,} \; fmode_{i1} = 1, \; fmode_{i2} = 1, \; \forall\,(i1, i2) \in I, \; \forall\,(o1, o2) \in O$$

$$landingtime_{i1} - landingtime_{i2} \geqslant csarr_{o1,o2} - M * y2_{i1,i2},$$

$$i1 \neq i2, \; o1 = cat_{i2}, \; o2 = cat_{i1}, \; fmode_{i1} = 1, \; fmode_{i2} = 1, \; \forall\,(i1, i2) \in I, \; \forall\,(o1, o2) \in O$$

When looking at delay times on an average basis, it is evident that HTP flights under the category distribution of 100M exhibited the lowest delay times in the EC model. For the other distributions, it can be observed that CS model has proven to be more effective in reducing delay times for HTP flights compared to other models. However, due to the trade-off approach, it has affected the delay times for LTP aircraft, but it has not significantly deviated from the results obtained from the other models.

The percentages provided in Figure 3 encompass the comparison of the results between the SOO model and the respective MOO models based on the averages for the given category distributions. Positive values indicate that the SOO model produced better results while negative values indicate that the corresponding MOO model achieved superior results.

In Figure 4, average delay times for each distribution are provided for the MOO and the SOO models. As evident from this figure, the model has scarcely utilized holding delays in any solution model or category distribution.

Multi-objective optimization inherently provides decision-makers with various solutions, catering to the complexities of conflicting objectives. The number of pareto-optimal points obtained from each MOO model is presented in Figure 5.

Table 2. *Average delays of HTP and LTP flights (sec.)*

	50H - 50M		70H - 30M		30H - 70M		100M	
Model	HTP delay	LTP delay	HTP delay	HTP delay	HTP delay	LTP delay	HTP delay	LTP delay
WSS	231.68	428.76	249.12	294.39	232.59	378.94	125.29	170.44
CS	167.86	557.50	183.27	364.17	202.40	461.56	109.86	181.99
EC	188.02	542.27	208.12	374.96	232.00	490.52	97.13	313.23
SOO	263.62	368.24	226.47	265.61	217.64	361.28	131.50	139.25

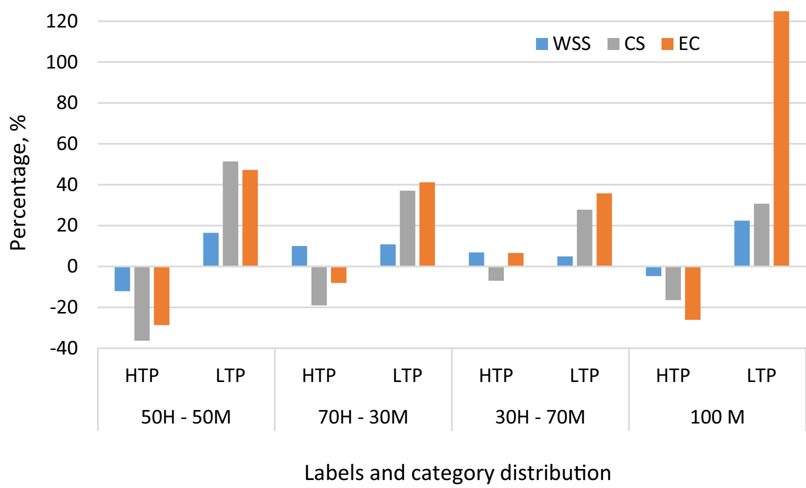

Figure 3. *Comparison of models in terms of HTP and LTP delays*

Figure 6 depicts the pareto-optimal fronts generated by the MOO models for the results of a randomly selected test problem in this study. In this figure, the discrepancy in the number of pareto-optimal points among the MOO models may indicate the effectiveness of each model in exploring the solution space. Specifically, the EC model seems to be the most effective in finding various trade-off solutions compared to the other models for the related category distribution and test problem.

Emission values calculated based on the MOO and the SOO models are represented in Figure 7. In the figure, average emission values for HC, CO, and NOx are provided for each MOO and the SOO model. In a 50H-50M distribution, the SOO model may be considered better choice for CO among the MOO models, whereas for NOx in the same distribution, the EC model yields a lower emission value. In the 100M distribution, the SOO and EC delivered better results than the others for the CO and the NOx pollutant, respectively.

For statistical analysis, Post hoc tests were performed based on ANOVA test results and given in Table 5.

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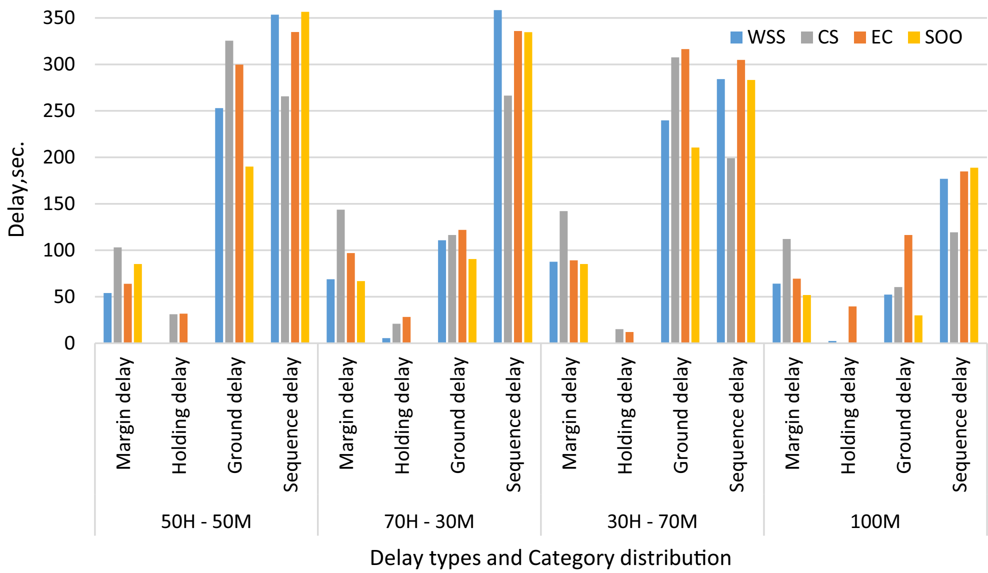

Figure 4. *Type of delays*

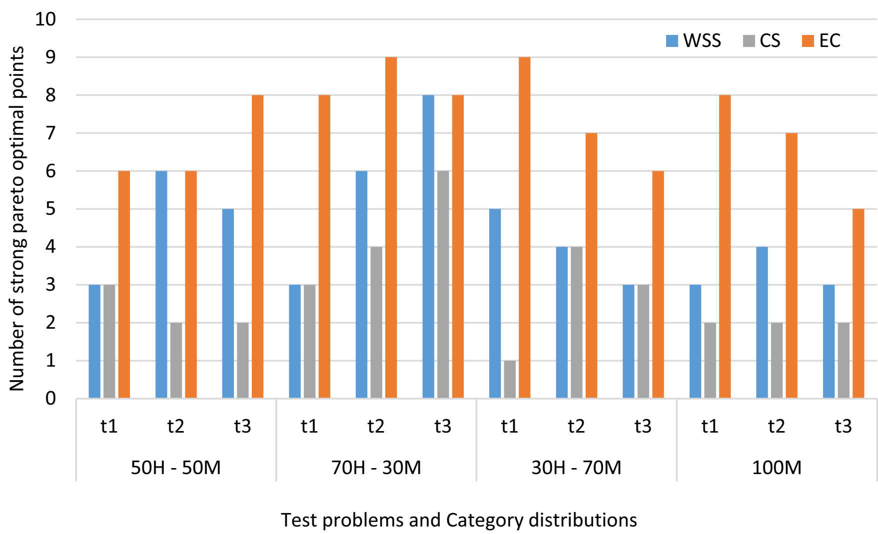

Figure 5. *Total number of pareto optimal points*

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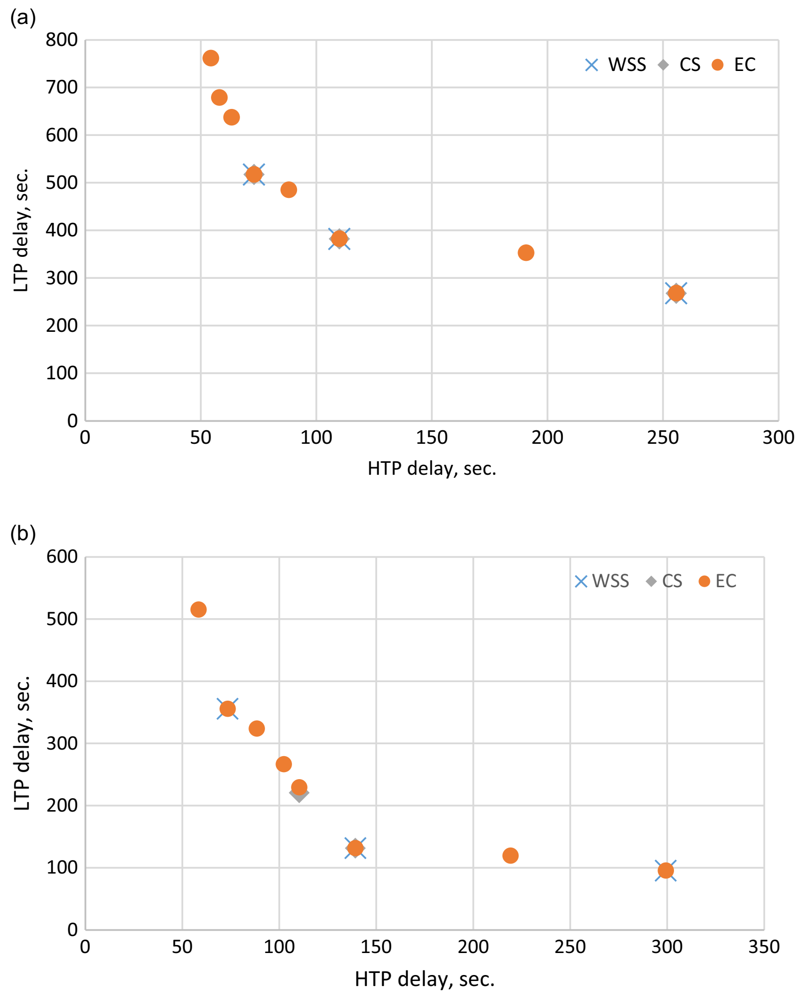

Figure 6. *Pareto optimal fronts of each MOO model (a: 70H-30M; test no: 1, b: 100M; test no: 1)*

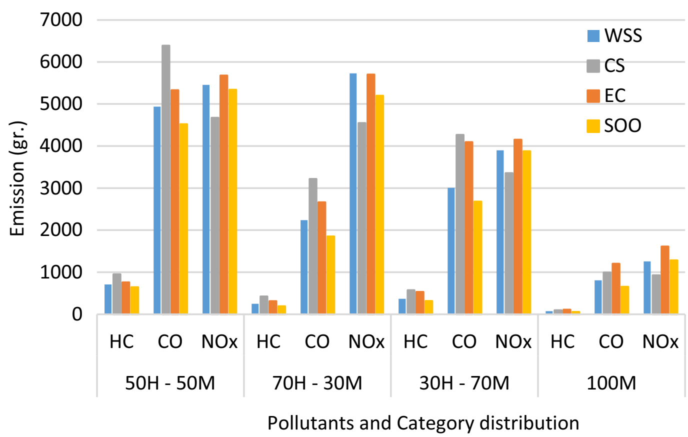

Figure 7. *Emission values for HC, CO and NOx*

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Table 5. *Post hoc tests*

Category Distribution	Dependent variables	**I (Independent variables)**	**J (Independent variables)**	**Mean Difference(I-J)**	Sig.
50H – 50M	**HTP delay**	WSS	CS	117.85	.000
		WSS	EC	71.51	.000
		EC	CS	46.34	.000
	LTP delay	CS	WSS	199.57	.000
		CS	EC	54.04	.000
		EC	WSS	145.53	.000
70H – 30M	**HTP delay**	WSS	EC	60.67	.000
		CS	EC	38.75	.006
	LTP delay	EC	WSS	104.69	.000
		EC	CS	99.40	.000
30H – 70M	**HTP delay**	WSS	CS	30.83	.000
		WSS	EC	45.17	.000
		CS	EC	14.34	.047
	LTP delay	CS	WSS	124.75	.000
		EC	WSS	148.90	.000
100M	**HTP delay**	WSS	EC	37.35	.000
		CS	WSS	30.73	.000
		CS	EC	68.09	.000
	LTP delay	WSS	CS	44.56	.000
		EC	WSS	149.91	.000
		EC	CS	194.48	.000

References

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