ParaILP: A Parallel Local Search Framework for Integer Linear Programming with Cooperative Evolution Mechanism (Technical-Appendix)

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1 Stability of ParaILP

To examine the stability of ParaILP which involves randomness, we execute ParaILP 10 times using 10 different seeds on the benchmark for 10s, 60s, and 300s time limits.

For all 10 times, we denote the average primal integral *P(T)* of each time by $\mathrm{avg}_{\mathrm{P(T)}}$, and the standard deviation of the primal integral by $\mathrm{std}_{\mathrm{P(T)}}$. As shown by the results in Table 1, for the time limits of 10s and 60s, the values of $\frac{\mathrm{std}_{\mathrm{P(T)}}}{\mathrm{avg}_{\mathrm{P(T)}}}$ for ParaILP are less than 0.5%; for the 300s, the values of $\frac{\mathrm{std}_{\mathrm{P(T)}}}{\mathrm{avg}_{\mathrm{P(T)}}}$ for ParaILP are less than 1.3%, indicating ParaILP exhibits stable performance.

Table 1: Performance of ParaILP with 10 different seeds.

Time Limit	$\mathrm{avg}_{\mathrm{P(T)}}$	$\mathrm{std}_{\mathrm{P(T)}}$	$\mathrm{std}_{\mathrm{P(T)}}/\mathrm{avg}_{\mathrm{P(T)}}$
10s	0.58593	0.00245	0.00418
60s	0.51331	0.00228	0.00445
300s	0.46316	0.00576	0.01244