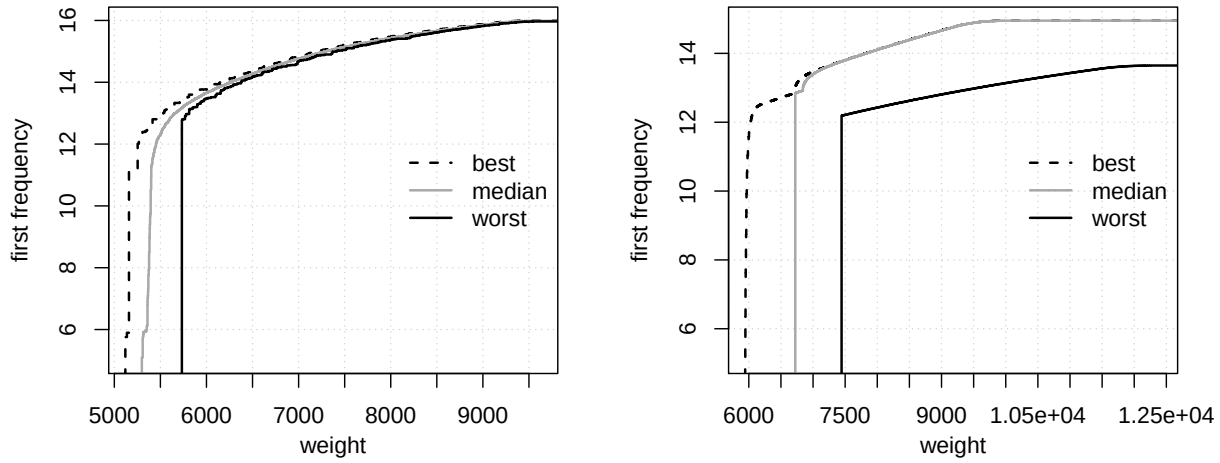
Solving multi-objective truss structural optimization problems considering natural frequencies of vibration and automatic member grouping

Érica C.R. Carvalho, José Pedro G. Carvalho, Heder S. Bernardino, Afonso C.C. Lemonge, Patrícia H. Hallak

This supplementary material presents the EAF best, median, and worst curves of the MOCRPSO algorithm for the analyzed trusses of all computational experiments. Figures 1-7 show the results for the 10-, 25-, 72-, and 200-bar trusses considering the continuous and discrete cases. In all figures, the cardinality used (or not) is indicated in the labels.



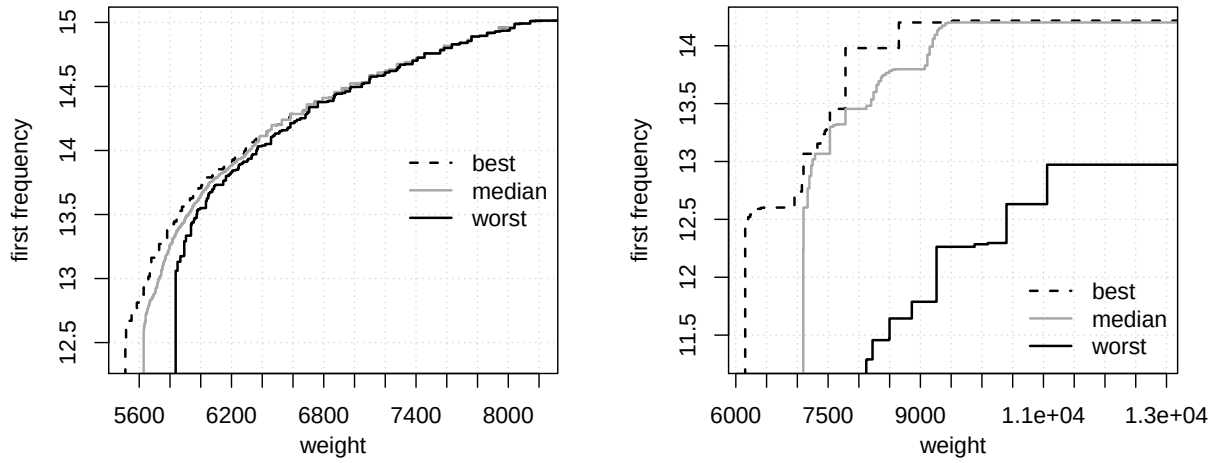
(a) no cardinality constraints

(b) $m = 2$

(c) $m = 4$

(d) $m = 8$

Figure 1: EAF curves (best, median, and worst) of the MOCRPSO algorithm for the 10-bar truss (continuous case).



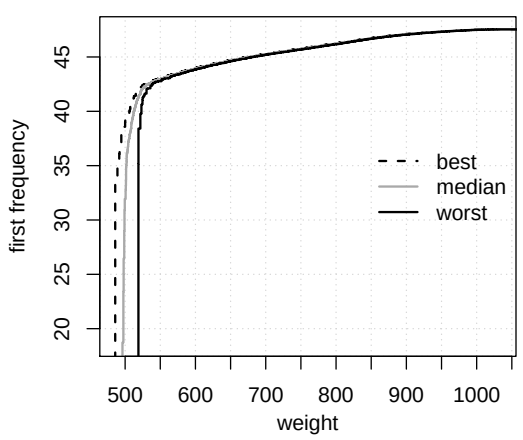
(a) no cardinality constraints

(b) $m = 2$

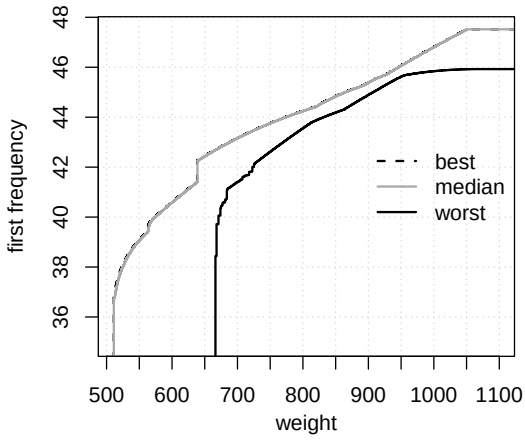
(c) $m = 4$

(d) $m = 8$

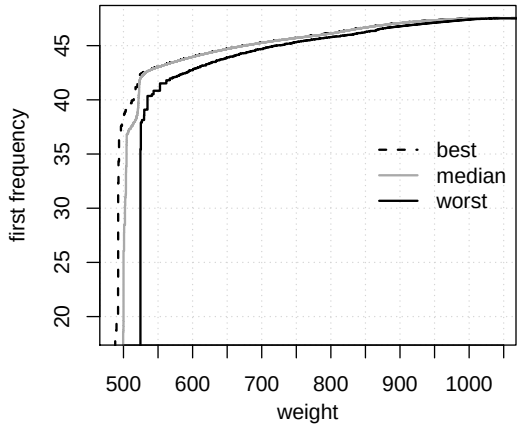
Figure 2: EAF curves (best, median, and worst) of the MOCRPSO algorithm for the 10-bar truss (discrete case).



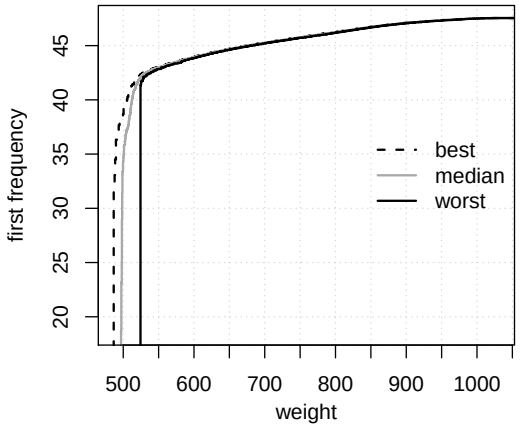
(a) no cardinality constraints



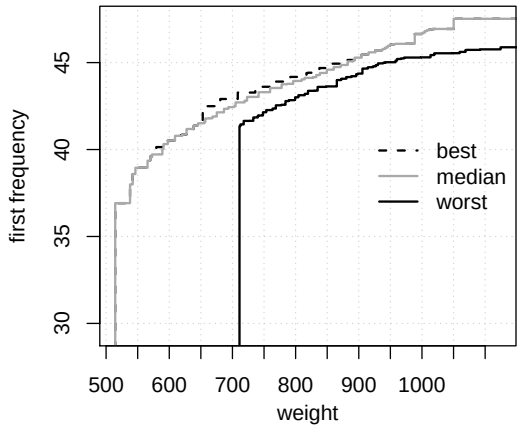
(b) $m = 2$



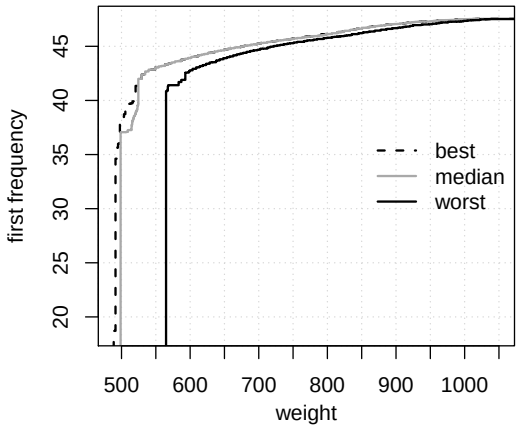
(c) $m = 4$



(d) no cardinality constraints

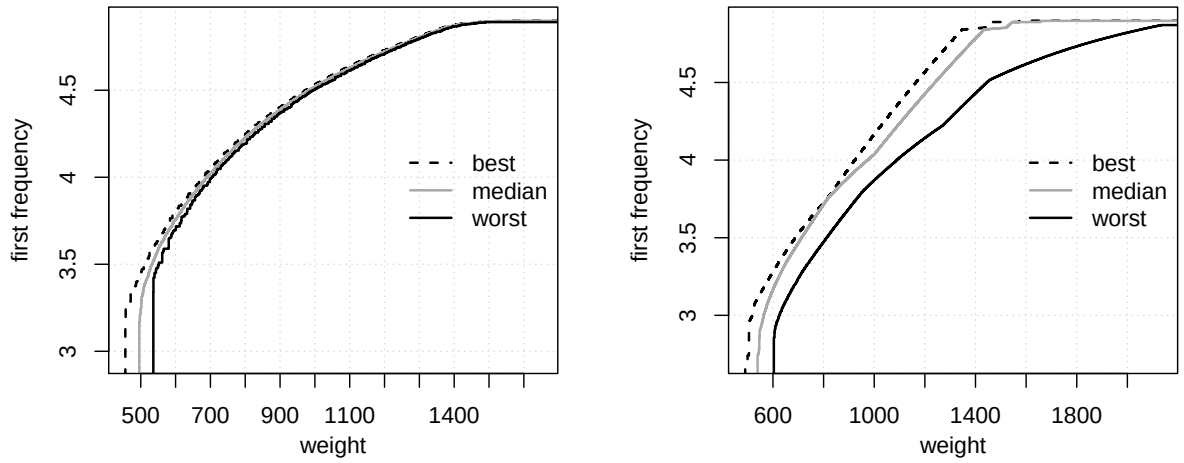


(e) $m = 2$



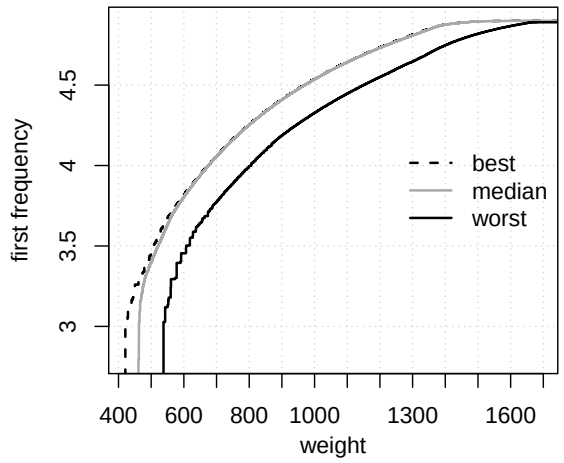
(f) $m = 4$

Figure 3: EAF curves (best, median, and worst) of the MOCRPSO algorithm for the 25-bar trusses - continuous case (figures a, b, c) and discrete case (figures d, e, f).

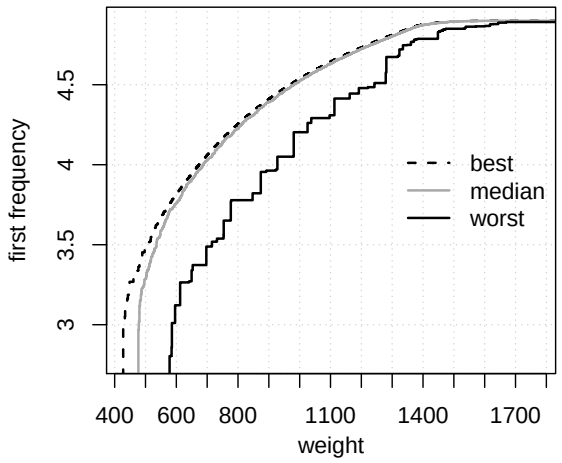


(a) no cardinality constraints

(b) $m = 2$

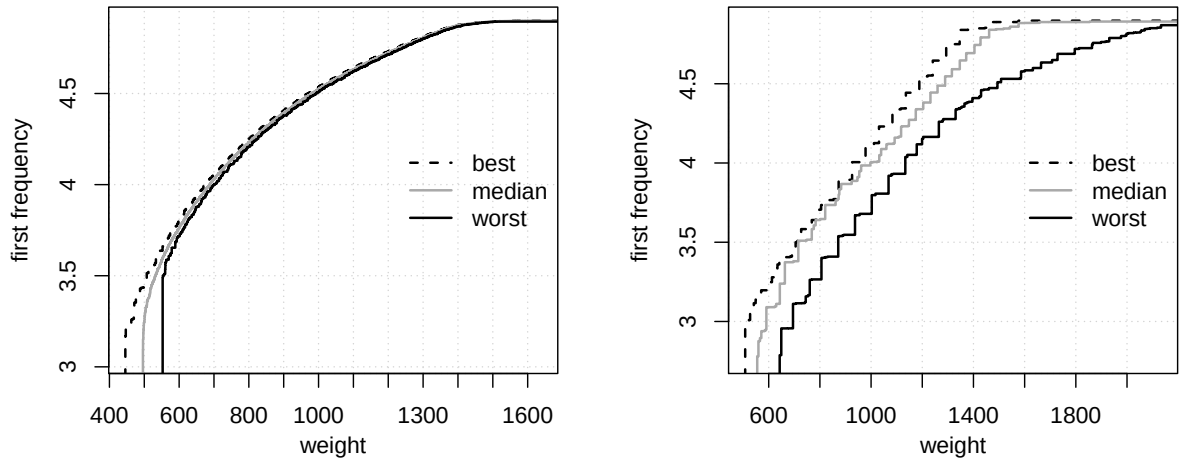


(c) $m = 4$



(d) $m = 8$

Figure 4: EAF curves (best, median,and worst) of the MOCRPSO algorithm for the 72-bar truss (continuous case).



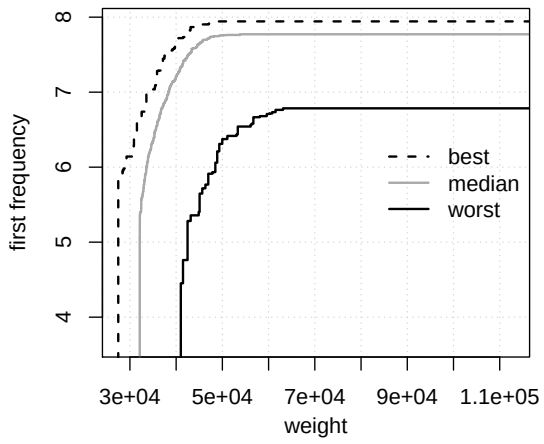
(a) no cardinality constraints

(b) $m = 2$

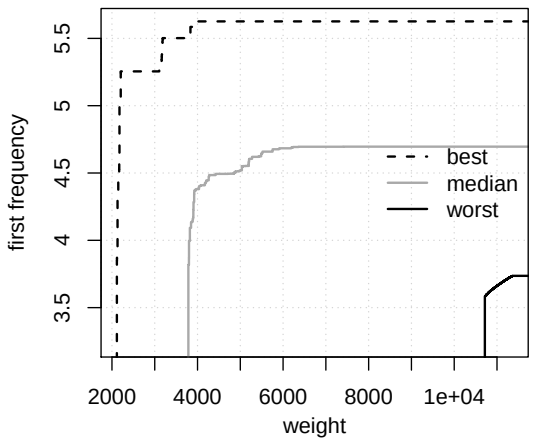
(c) $m = 4$

(d) $m = 8$

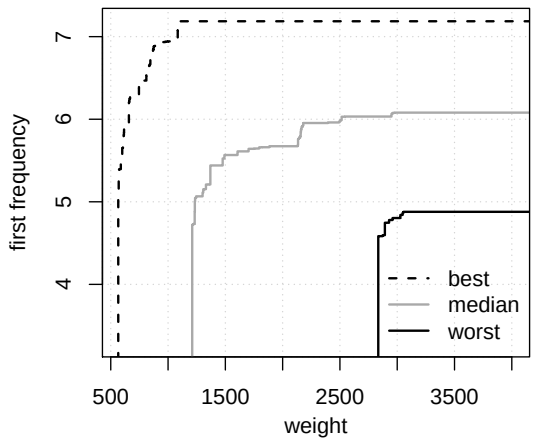
Figure 5: EAF curves (best, median, and worst) of the MOCRPSO algorithm for the 72-bar truss (discrete case).



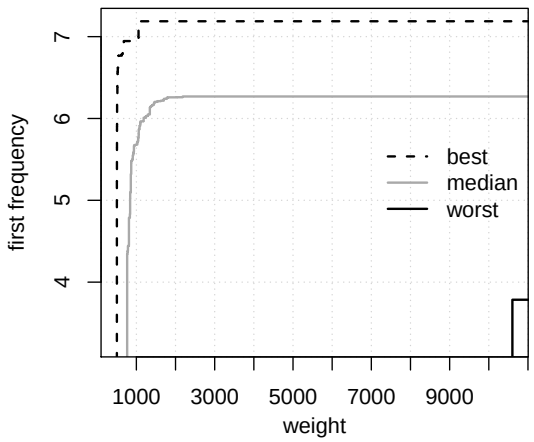
(a) no cardinality constraints



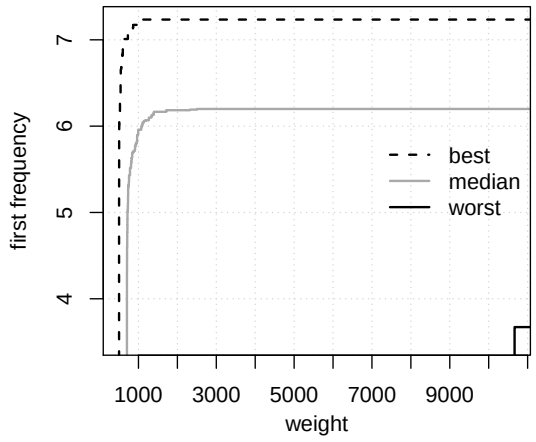
(b) $m = 2$



(c) $m = 4$

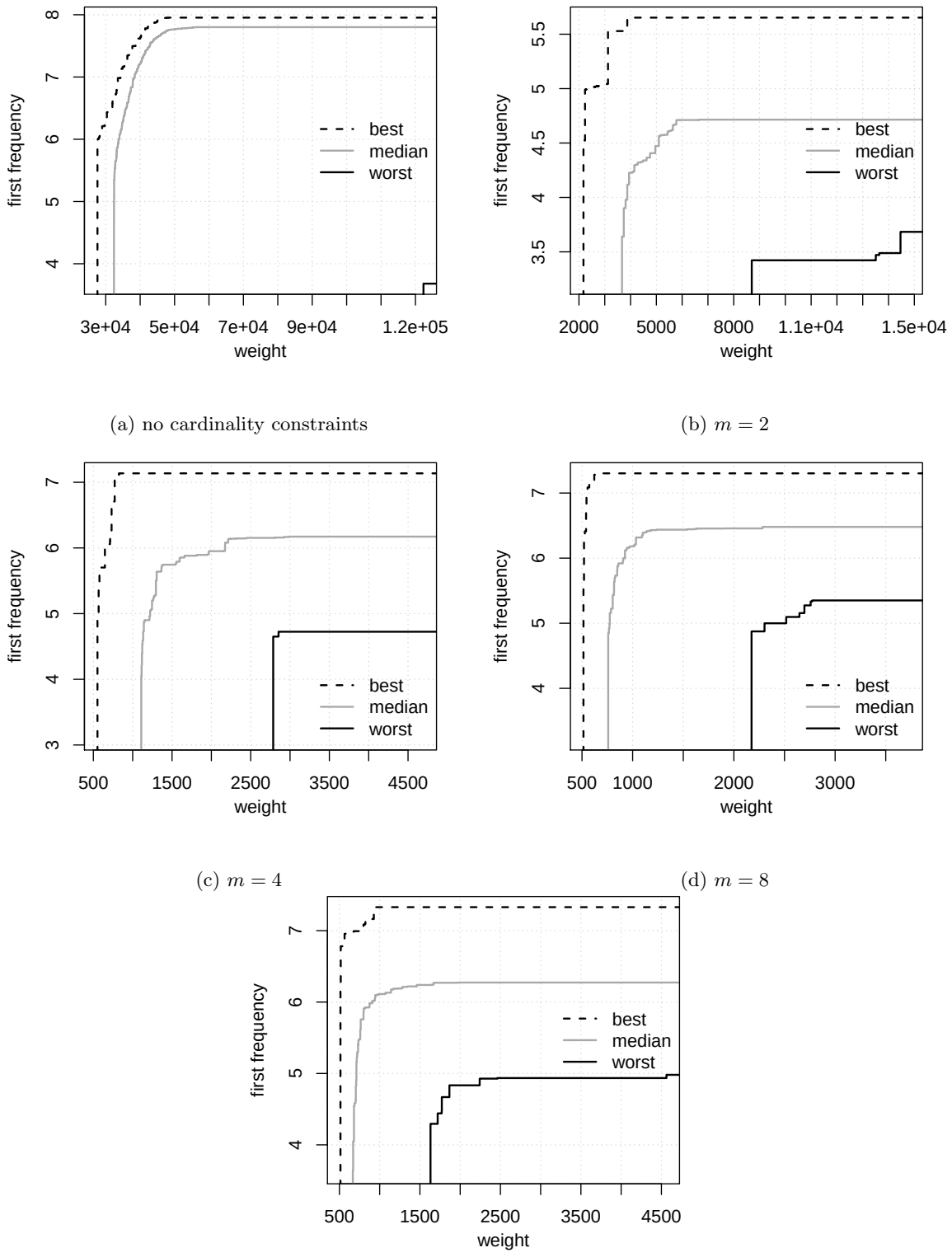


(d) $m = 8$



(e) $m = 16$

Figure 6: EAF curves (best, median, and worst) of the MOCRPSO algorithm for the 200-bar truss (continuous case).



(a) no cardinality constraints

(b) $m = 2$

(c) $m = 4$

(d) $m = 8$

(e) $m = 16$

Figure 7: EAF curves (best, median, and worst) of the MOCRPSO algorithm for the 200-bar truss (discrete case).