Cohort Fairness in Examination Timetabling Problems

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Abstract: We will report on progress regarding fairness between students in the context of the examination timetabling problem. Our data from a student survey regarding their examination timetable suggests that they do care about fairness, especially fairness amongst students in their cohort. Continuing from our previous work [1,2], we extend the well-studied benchmark examination timetabling problem formulations (Toronto, ITC 2007 and Yeditepe) to also account for fairness, and giving models with three objectives; the original standard objective function, aggregate (global) student fairness, and average fairness within cohorts. To solve the resulting instances, we have implemented a hyper-heuristic approach combining self-adaptive learning mechanism as a low-level heuristic selection strategy and great deluge algorithm as a move acceptance strategy – hybridising the hyper-heuristic with weighted Tchebycheff approach and also with NSGA-II algorithm, all within an extension of the Hyflex framework. Experimental results will show that incorporating the classical 'weighted Tchebycheff' method within a multi-objective hyper-heuristic framework is effective, and outperforms NSGA-II. We also observe that the potential for fairness improvements is much more significant for the cohort measures than for the aggregate fairness.

Keywords Fairness · Examination timetabling problem · hyper-heuristic

References

1. Muklason, A., Parkes, A.J., McCollum, B., Özcan, E.: Initial results on fairness in examination timetabling. In: Proc. of MISTA 2013., pp. 777–780 (2013)
2. Muklason, A., Parkes, A.J., McCollum, B., Özcan, E.: Fairness in examination timetabling problems: A survey and the new problem formulation. In: Proc. of PATAT 2014., pp. 512–515 (2014)

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