Seat Reservation Allowing Seat Changes

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June 5, 2001

Abstract

We consider a new variant of the Seat Reservation Problem in which seat changes are allowed. We analyze the problem using the competitive ratio and the competitive ratio on accommodating sequences. A very promising algorithm defined in this paper is Min-Change, which will ask passengers to change seat, only if they would otherwise have been rejected. Min-Change belongs to a large class of *conservative* algorithms, for which we prove very high performance guarantees. For instance when assuming that all of the passengers could have been seated by an optimal off-line algorithm, at least $\frac{2}{3}$ of the passengers can be seated on-line with only one seat change and at least $\frac{3}{4}$ will be seated if two seat changes are allowed. This should be compared to the performance guarantee of $\frac{1}{2}$ for the best deterministic on-line algorithm when no seat changes are allowed.

Keywords: On-line algorithms, competitive ratio, accommodating function.

*Supported in part by the Danish Natural Science Research Council (SNF) and in part by the IST Programme of the EU under contract number IST-1999-14186 (ALCOM-FT).