

## A Combined Approximation for the Traveling Tournament Problem and the Traveling Umpire Problem

We consider the traveling tournament problem (TTP) and the traveling umpire problem (TUP). In TTP, the task is to design a double round-robin schedule, where no two teams play against each other in two consecutive rounds, and the total travel distance is minimized.

In TUP, the task is to find an assignment of umpires for a given tournament such that every umpire handles at least one game at every team's home venue and an umpire neither visits a venue nor sees a team (home or away) too often. The task is to minimize the total distance traveled by the umpires.

We present a combined approximation for this problem, when the number of umpires is odd. We therefore first design an approximation algorithm for TTP and then show how to define an umpire assignment for this tournament such that a constant-factor approximation for TUP is guaranteed.