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Presentation

Set covering and the replication conjecture

Set covering is a central problem in optimization with numerous business applications. As an example, airlines must assign rotations of their crews to cover the flight legs that they scheduled for the coming month. A key aspect of set covering is that it requires 0,1 solutions. Linear programming can handle very large scale problems of this sort but allows for fractional solutions as well. In some cases, however, solving the linear program results in a 0,1 solution, due to the structure of the underlying set covering problem. Sometimes, both the primal linear program and its dual have integer solutions. In 1993, Michele Conforti and myself made a conjecture about the structure that makes this happen, the so-called replication conjecture. This conjecture is still open and has attracted renewed interest recently.