Routing of elastic traffic in the Internet should be fair in terms of bandwidth allocated to individual traffic demands. One fairness principle that can be applied is called max-min fairness (MMF) and requires that the worst bandwidth allocation is maximized and the solution is then extended with maximization of the second worst allocation, the third one, and so on. In this paper we discuss solution algorithms for basic MMF optimization problems related to fair routing in communications networks. Due to lexicographic maximization of ordered quantities, the MMF solution concept cannot be tackled by the standard optimization model, i.e., a mathematical programme. However, one can formulate a sequential lexicographic optimization procedure. The basic procedure is applicable only for convex models, thus it allows to deal with relatively simple routing problems but fails if practical discrete restrictions commonly arising in the communications network context are to be taken into account. Then, however, alternative sequential approaches allowing to solve non-convex MMF problems can be used.

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