The inverse power index problem

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Weighted voting games are frequently used in decision making. Each player has a weight and each proposal is accepted if the weight sum of the supporting players exceeds a quota. One line of research is the efficient computation of so-called power indices measuring the influence of a player. We treat the inverse problem: Given an influence vector and a power index, determine a weighted voting game such that the distribution of influence among the players is as close as possible to the given target value. We present exact algorithms and computational results for the Shapley-Shubik index.