Towards Transparent Voting Power: An Analysis of Fixed Systems of the Shapley-Shubik and Banzhaf Power Indices

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In many scenarios, from democratic governance to decision-making in corporate boards and international organizations, voting plays a crucial role. However, not all votes carry the same weight -- some participants may have more influence over the final outcome than others. To quantify this influence, we use two power indices, which measure how often a player's vote is decisive in a given system. We give examples of applications of the indices in various fields. We examine the voting systems where a player's power accurately reflects their share. This is not only theoretically interesting but also practical for example in corporate settings, where it can improve decision-making processes and predict other shifts in influence. We analyze those systems towards the two power indices and mathematically determine how they should be structured. Subsequently, we interpret our results and implement them in a web-based tool, making it accessible for any company or group seeking transparency in the distribution of voting shares or influence.

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