On a directed variation of the 1-2-3 and 1-2 Conjectures

In this paper, we consider the following question, which stands as a directed analogue of the well-known 1-2-3 Conjecture: Given any digraph $D$ with no arc $uv$ verifying $d^+(u) = d^-(v) = 1$, is it possible to weight the arcs of $D$ with weights among 1; 2; 3 so that, for every arc $uv$ of $D$, the sum of incident weights out-going from $u$ is different from the sum of incident weights in-coming to $v$? We answer positively to this question, and investigate digraphs for which even the weights among 1; 2 are sufficient. In relation with the so-called 1-2 Conjecture, we also consider a total version of the problem, which we prove to be false. Our investigations turn to have interesting relations with open questions related to the 1-2-3 Conjecture.

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