Let $G = (V, E)$ be a finite, undirected simple graph. Karoński, Łuczak and Thomasson introduced and investigated a coloring of the edges of a graph with positive integers so that adjacent vertices have different sums of incident edge colors. More precisely, let $f : E \rightarrow \{1, 2, \ldots, k\}$ be an edge coloring of $G$ (such a coloring is also called a $k$-coloring of $G$). For $x \in V$ we define
\[
\sigma(x) := \sum_{e \ni x} f(e).
\]
A $k$-coloring $c$ of $G$ is called neighbor sum distinguishing if $\sigma(x) \neq \sigma(y)$ whenever $xy \in E(G)$. In other words, the vertex coloring $\sigma$ induced by $f$ in the above described way must be proper.

The minimum integer $k$ for which there is a neighbor sum distinguishing coloring of a graph $G$ will be denoted by $\chi_\Sigma(G)$.

The following elegant problem, known as the 1-2-3 Conjecture, was posed in 2004.

**1-2-3 Conjecture.** Let $G$ be a connected graph, $G \neq K_2$. Then $\chi_\Sigma(G) \leq 3$.

Since its introduction, the 1-2-3 Conjecture has been attracting ingrowing attention, resulting in many research works considering either the conjecture itself or variants of it.

In the talk, we focus on the directed analogues of the 1-2-3 Conjecture. This talk is based mainly on a joint work with Mirko Horňák (UPJS University, Košice, Slovakia) and Jakub Przybyło (AGH University, Cracow, Poland).

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