

<Paragraph 1>

The paper investigates the Friendship Paradox (FP) and Generalized Friendship Paradox (GFP) in signed social networks containing both positive and negative links. The FP states that on average, an individual's friends have more friends than the individual. The GFP extends this to other characteristics that are positively correlated with popularity, such as influence or activity level. Prior work has focused only on positive links, while negative links like foes or distrust connections are ubiquitous in real-world networks.

</Paragraph 2>

To bridge this gap, the authors propose first-order and second-order "signed neighbor paradox" metrics that capture the interplay between positive and negative links in relation to the FP and GFP. The first-order metric measures the ratio of a node's neighbors (of various positive/negative types) that have more positive/negative links than the node itself. The second-order metric compares the average positive/negative degrees in a node's positive neighborhood versus its negative neighborhood.

</Paragraph 3>

The authors evaluate these metrics on five signed network datasets from online and offline sources. Key findings include: positive neighbors tend to have more positive links than the node, while negative neighbors tend to have more negative outgoing links; nodes give more negative links than they receive; and for most nodes, their positive neighbors have more positive links than their negative neighbors' positive links. The signed paradox metrics provide new insights into FP and GFP patterns involving negative links in signed networks.