Visualizing structural balance in signed networks

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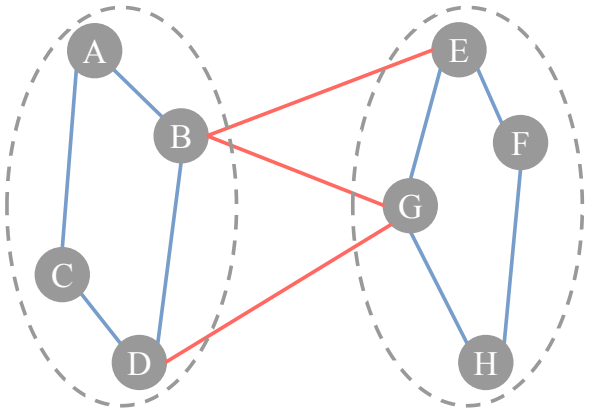
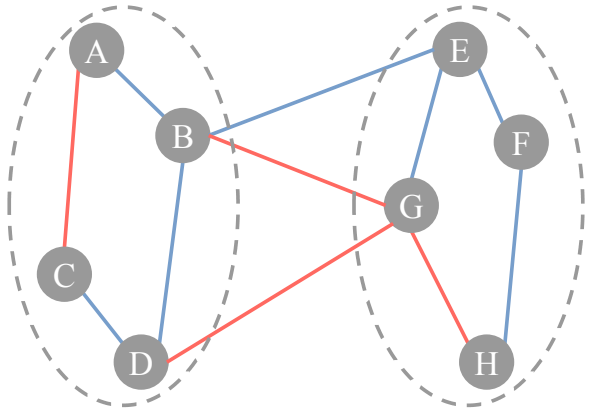
Signed networks and structural balance

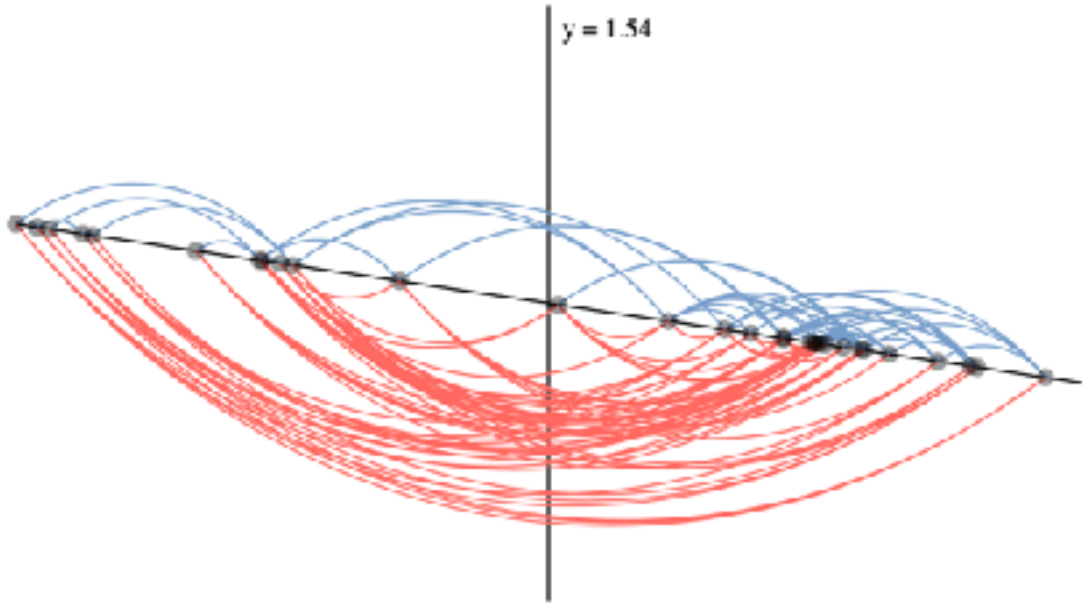
- in **signed networks** edges are annotated as **positive** or **negative**
- **structural balance** is applied to signed networks for, e.g., the analysis of **opinion formation**
- a signed network is **structurally balanced** if all cycles are balanced or, equivalently, nodes can be divided into **two sets** having all **positive edges within** and all **negative edges in-between**



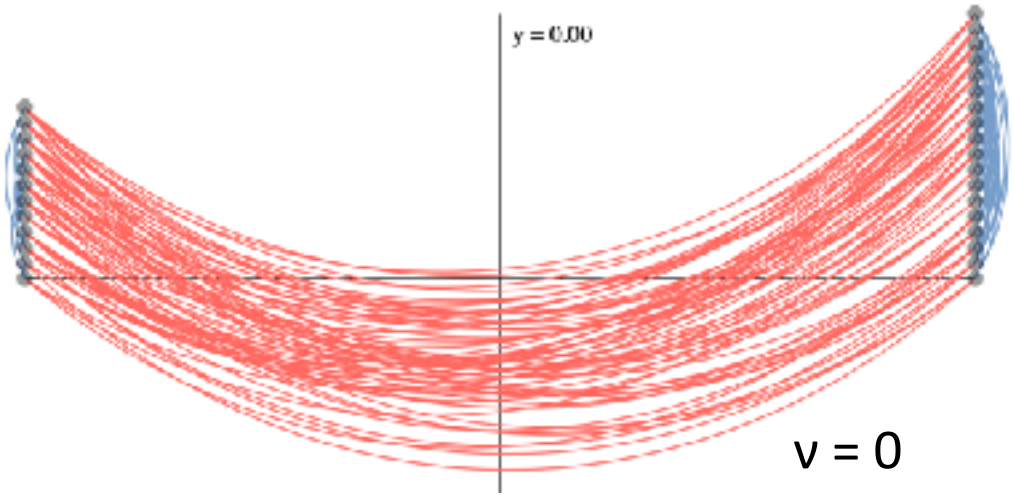


Structural-balance-viz

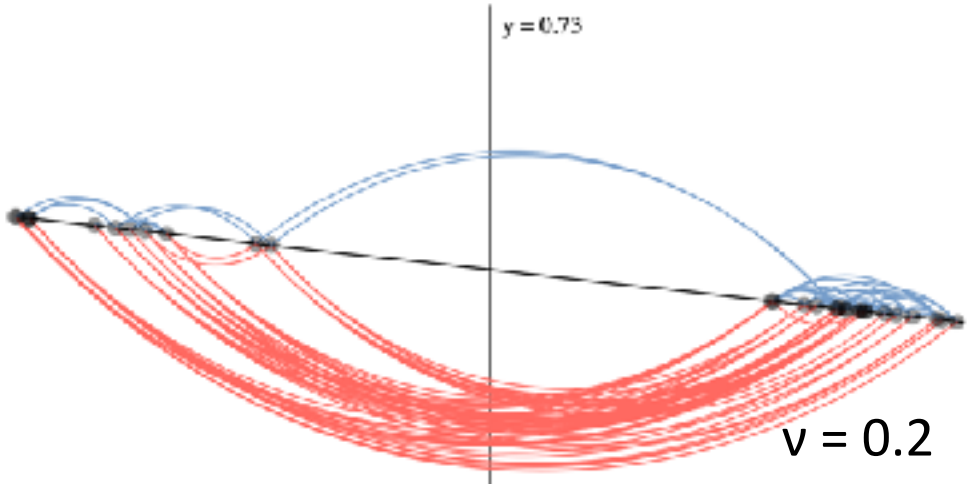
- it exploits **spectral computations** of the **signed Laplacian** matrix
- it shows the **level of balance** of a network
- it visualizes the **individual polarization of each node**
- it identifies **two factions** of nodes and **compares** their **cumulative characteristics**
- the visualizations are **reproducible** and **comparable**



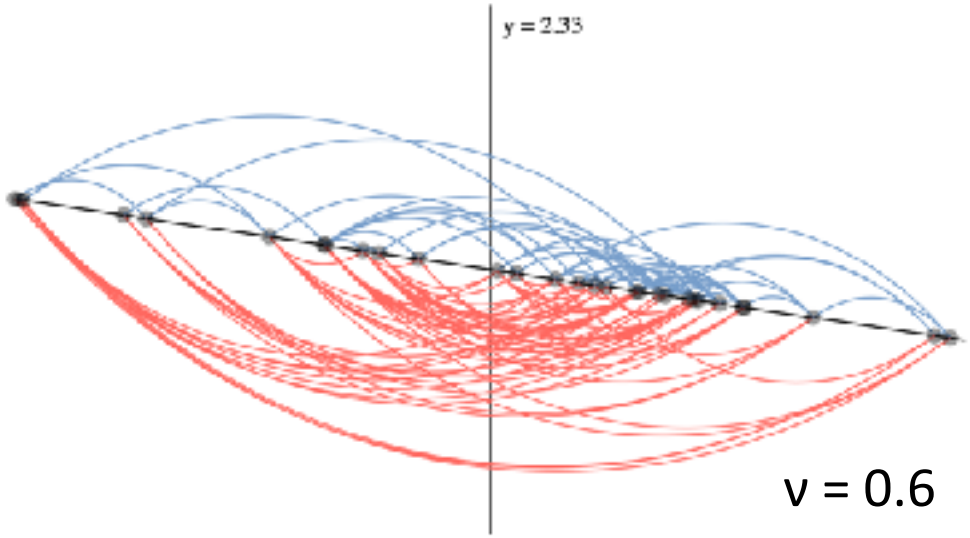
Comparability



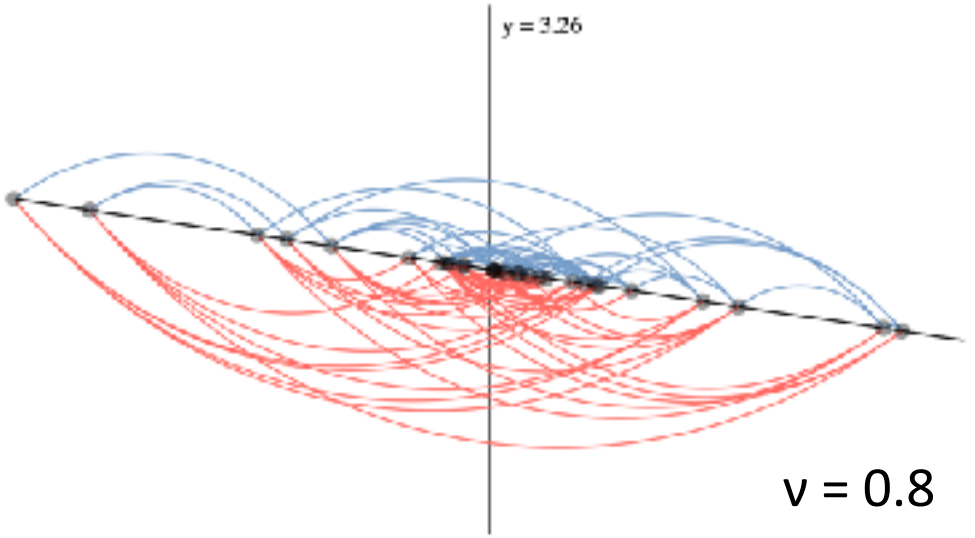
ν = 0



ν = 0.2

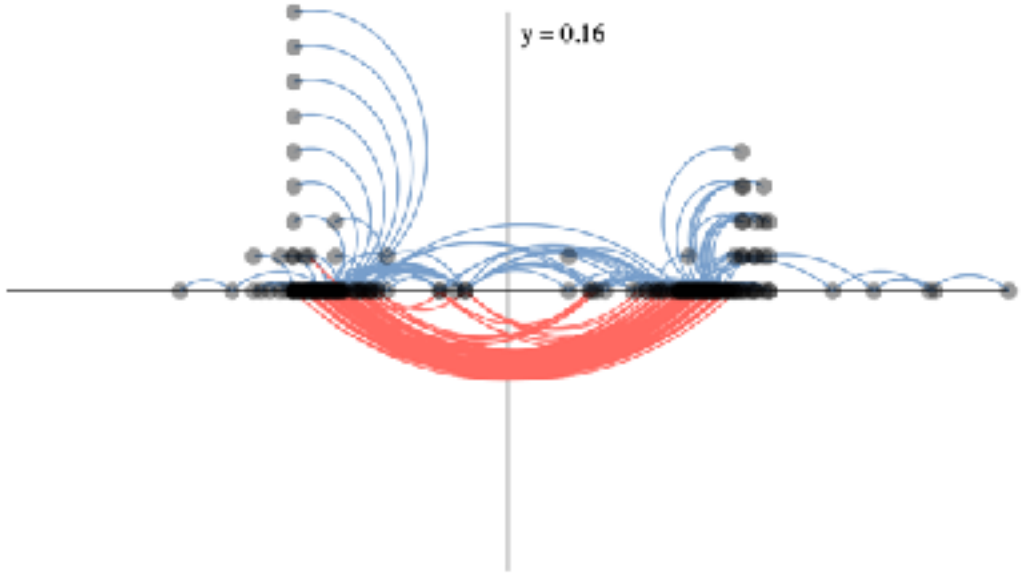


ν = 0.6

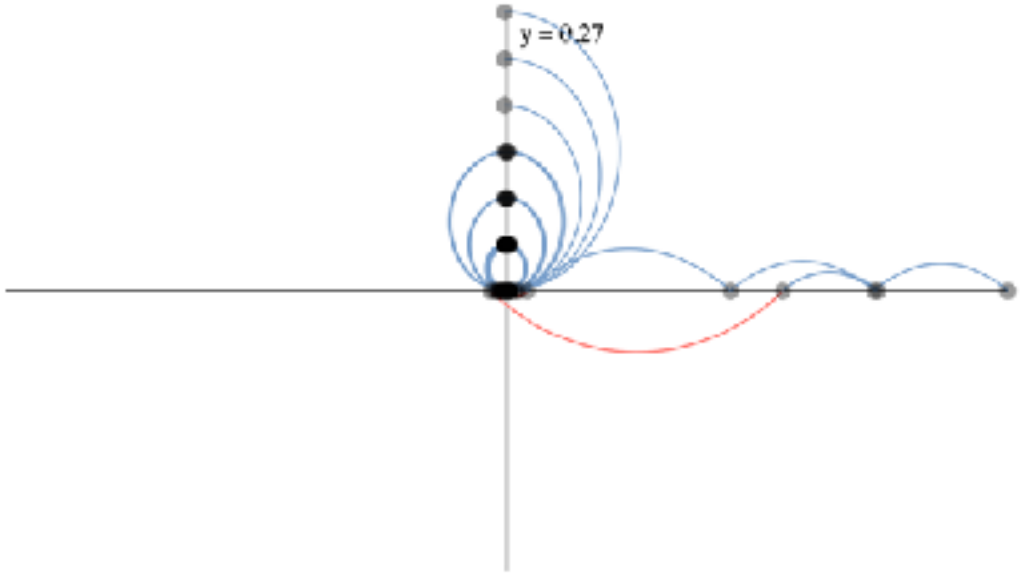


ν = 0.8

United States Congress network



original



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