

This paper solves consensus problems for networked agents whose interactions with each other are described by signed digraphs. The Laplacian matrix of a signed digraph is studied by introducing rooted cycles, and the relationship between it and the spanning tree condition is addressed. In particular, the Laplacian matrix of a signed digraph with spanning trees is positive stable if and only if there is at least one negative rooted cycle; otherwise, it has exactly one zero eigenvalue if and only if either there exist no rooted cycles or all existing rooted cycles are positive. It is shown that all agents reach interval bipartite consensus if their associated signed digraph has a spanning tree. Further, the consensus values of all agents depend only on the initial states of those agents which are associated with root vertices. The developed consensus results are applicable for multi-agent systems with both continuous-time and discrete-time dynamics. Illustrative examples are provided to demonstrate interval bipartite consensus performances for multi-agent systems associated with different signed digraphs which all contain spanning trees but are not strongly connected.