

Some necessary and sufficient conditions are derived for the stability of a networked system with linear time invariant dynamics. Connections among its subsystems are fixed but arbitrary, and every subsystem can have different dynamics. Based on these results, some necessary or sufficient conditions are further obtained for both its stability and robust stability, which essentially depend only on parameter matrices of each individual subsystem and the subsystem connection matrix. This characteristic makes them attractive in the analysis and synthesis of a large scale networked system.