ABSTRACT: Self-erecting structures eliminate the needs of expensive scaffolding and they are safer and faster to construct. This paper deals with the application of nonlinear analysis to study the erection of space trusses by tensioning of cables placed inside some chord members. Based on the study, the criteria and parameters that govern and influence the erection of framework are identified. The arrangement of cables and the magnitude of tensioning forces need to be pre-determined based on the final structural configuration to be achieved. A special program has been developed to examine the precise conditions under which self-erection is possible, and whether or not the erection process induces self-equilibrium internal stress states at each incremental step. Several examples, including square-grid and hexagonal-grid space trusses, have been considered for the study. It is found that Maxwell’s rule governing the requirement of number of joints, members and kinematic constraints at the supports of a structural assembly is not sufficient to determine the feasibility of erection by cable-tensioning. The proposed analysis technique and procedure is capable of simulating the erection process and, at the same time, monitoring the stability condition of the structure during the self-erecting process.