Newton-waveform method for simulation of constrained multibody systems

Paweł Tomulik (Warsaw University of Technology), Janusz Frączek

The Newton-waveform method provides means for distributed integration of differential equations next to other known methods such as multirate integration or waveform relaxation. In our work we use Newton-waveform to co-simulate multibody systems coupled by kinematic constraints. Two such algorithms are presented – the one which converts nonlinear equations of motion into series of linear DAEs with time-varying coefficients and the other which solves coupling constraint equations over prescribed time interval while the subsystem equations are integrated by subsystem simulators. Both algorithms are outlined and their basic properties are illustrated with numerical examples.