

## **A Combined State-Space Nodal Method for the Simulation of Power System Transients**

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**Abstract:** This paper presents a new solution method that combines state-space and nodal analysis for the simulation of electrical systems. The presented flexible clustering of state-space-described electrical subsystems into a nodal method offers several advantages for the efficient solution of switched networks, nonlinear functions, and for interfacing with nodal model equations. This paper extends the concept of discrete companion branch equivalent of the nodal approach to state-space described systems and enables natural coupling between them. The presented solution method is simultaneous and enables benefitting from the advantages of two different modeling approaches normally exclusive from one another.

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