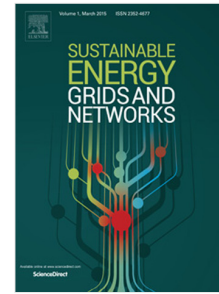


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# Advances in Distribution System Analysis with Distributed Resources: Survey with a Case Study

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## Abstract

Distribution System Analysis (DSA) is witnessing a renewed interest in the presence of distributed energy resources along with the Smart Grid initiatives in the form of setting up of new information and communication layer for management and control of energy resources and network components in recent times. The centralized generation, dispatch and control philosophy is giving way to new decentralized approaches in power grids where penetration of intermittent sources of energy is increasing. It has necessitated the modeling of distribution network components even up to and including secondaries of distribution transformers. In this context, the present article reviews recent advances in (a) modeling of distribution network components including distributed generators, (b) distribution power flow algorithms and (c) simulation tools for planning and operations of Active Distribution Networks (ADNs). It also includes a case study of an actual ADN operating in India with sequential time simulations over the period of one year. The article is aimed at providing a holistic view - with a demonstration of a case study - of

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