Sequential simulation applied to composite system reliability evaluation

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Abstract— The authors extends the application of sequential simulation to the analysis of composite generation and transmission systems. The authors summarise the basic characteristics of sequential simulation and describe theoretical and computational techniques that include models for the transmission system within the simulation process itself. They show how the very nature of sequential simulation can be used with advantage to reduce significantly the computational effort that the simulation of composite systems originally involves. Algorithms based on the sensitivity of system busbars to overloads are developed to simulate generation redispatch and load-shedding procedures. The feasibility of these reliability assessments for composite systems is demonstrated by applying the techniques to single and multiple IEEE reliability test systems.

Index Terms— Power generation, Load flow analysis, Reliability, Power transmission