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Random Network Models of Power Grids[1] PER ARNE RIKVOLD, IBRAHIM ABOU HAMAD, Florida State University, SVETLANA V. POROSEVA, Univeristy of New Mexico — Power grids are complex engineering systems of vital importance to modern societies, and it is important to understand how to improve their resilience to various kinds of damage. However, it is often difficult to obtain detailed data on the structures, generating capacities, and power demands for real power systems. In order to be able to test network-analysis algorithms under a variety of conditions, it is therefore useful to develop artificial models that can be tuned to reflect properties of real grids, and that also can be scaled to study effects of the grid size and shape. Here we present a methodology to use Monte Carlo simulations to generate random grids that agree with the degree distribution for the vertices (power plants and consumers) and the length distribution for the transmission lines in the Florida high-voltage power grid. These model grids are used to test the performance of algorithms to partition the grid into semi-independent islands. We find that it is more difficult to partition the model grids than the real Florida grid, suggesting that the real grid contains correlations that are absent in our current generation of models.

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