

In order to ensure the reliable operation of the electric power grid, infrastructure with increasing levels of distributed generation deployment, various entities and subsystems (e.g., ISOs, distribution utilities, micro-grids) needs a higher level coordination. Such coordination requires a formal decentralized control and management architecture that creates mechanisms for the operation and planning of numerous entities. A key function in power system operations and planning is the determination of total transfer capability (TTC), or the maximum amount of power that can be transferred from a set of source points to a set of sink points. This paper develops an algorithm for the decentralized computation of TTC through the application of the domain decomposition method (DDM). DDM decouples the correlation among interconnected control areas by taking advantage of the Schur complement matrix to form the power transfer distribution factor matrix. The decentralized TTC evaluation requires sparse information exchange among control areas. It is efficient and fully parallelizable. We demonstrate the decentralized TTC evaluation method on the IEEE 118-bus test case.