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"Utilização de Algoritmos Genéticos para a Localização Ótima de Pontos de Medição em Redes Elétricas"

Data redundancy is one of the main ingredients for the success of State Estimation (SE). With an adequate level of redundancy SE can deal with problems related to detection, identification, and elimination of gross errors. It also avoids that the temporary loss of data compromises the quality/reliability of estimates. The redundancy is evaluated considering the number, type and localization of the measurement points. Since data amount is directly related to the investment in equipments for data acquisition and transmission of information, it is very common to have metering systems with redundancy reduced during the management of fund allocation. During the system operation, changes in the network configuration pattern or a temporary inadequate functioning of the data acquisition system may reduce the level of redundancy for the EE. Even critical levels may be reached, characterizing situations of imminent loss of observability, and, consequently, inadequate performance of routine processing of gross errors. Such levels of redundancy are associated with the presence of critical measures and sets. A measurement become critical if its absence from the processed data set leads the supervised network to a loss of observability. A critical set is defined as being the one formed by a group of measures in which the removal of any of the measurements render all the left measurements the remaining of the set of critical measures. The present dissertation deals with the problem of the projection of measurement systems, which is characterized by the achievement of a better distribution of measurement devices (considering type, localization, and number) that leads to a trustful (free of gross errors) estimate of the operative state quality obtained for the whole supervised network (including equipments for measurement, communication, and data acquisition) at the lowest cost. The optimization technique chosen to deal with this problem was the Genetic Algorithms for its flexibility and simplicity of implementation.