Methodical approach to weak buses and ties detection in a power system

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Abstract—**The paper covers a complex approach to weak buses and ties detection in a power system. The applied method is based on singular value decomposition of sensitivity matrix to identify the weak spots in a power system and the traceability of the power flows to identify the overloaded transmission lines and power transformers. The singular analysis of weak spots problem implies the evaluation of the right and the left singular vectors' elements related to the minimal singular value of sensitivity matrix and the evaluation of its derivative with respect to a controllable parameter as well. The theory of the power flows traceability in its turn is applied to assess the ratio of the power delivered by a specific source to a certain electric line.**

Keywords—**power system; power flows traceability; sensitivity matrix; weak tie**

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