

## **Power Flow and Modal Analysis of a Power System Including Unified Power Flow Controller**

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**Abstract :** The Flexible AC Transmission System (FACTS) technology is a new advanced solution that increases the reliability and provides more flexibility, controllability, and stability of a power system. The Unified Power Flow Controller (UPFC), as the most versatile FACTS device for regulating power flow, is able to control respectively transmission line real power, reactive power, and node voltage. The main purpose of this paper is to analyze the effect of the UPFC on the load flow, the power losses, and the voltage stability using NEPLAN software modules, Newton-Raphson load flow is used for the power flow analysis and the modal analysis is used for the study of the voltage stability. The simulation was carried out on the IEEE 14-bus test system.

**Keywords :** FACTS, load flow, modal analysis, UPFC, voltage stability

**Conference Title :** ICEET 2016 : International Conference on Electrical Engineering and Technology

**Conference Location :** Paris, France

**Conference Dates :** February 22-23, 2016