

# Reduction of Losses & improvement in voltage profile in a Transmission Line using UPFC

**K. Malathi**

*Lecturer in EEE Department of Technical Education, Telangana*

---

**Abstract**—The Unified Power Flow Controller (UPFC) stands out as a highly adaptable and intricate power electronic device designed to manage and enhance power flow within electrical power transmission systems. This research delves into the realm of real and reactive power flow control along a transmission line, focusing on the strategic placement of UPFC at the sending end. In the absence of UPFC, the regulation of real and reactive power losses in the transmission line becomes unattainable. The primary objective of this paper is to showcase the control and efficacy of UPFC when implemented on the specified transmission line to minimize power losses. The paper introduces a model for state estimation incorporating UPFC, building upon the conventional power system state estimation model. This model utilizes a power injection approach, where the impact of UPFC on power flow is translated to the two nodes corresponding to the transmission line. The proposed methodology can be seamlessly integrated into conventional state estimation using MATLAB Programming, incorporating the nuances of UPFC. To validate the effectiveness of the proposed techniques, the research employs both a five-bus system and an UPFC on power flow is translated to the two nodes corresponding to the transmission line. The proposed methodology can be seamlessly integrated into conventional state estimation using MATLAB Programming, incorporating the nuances of UPFC. To validate the effectiveness of the proposed techniques, the research employs to IEEE-14 bus test power system.