Multi-teriminal UPFC for power system deregulation

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Abstract

One original purpose of FACTS controllers is to increase the transmission capacity of existing lines thus deferring the necessity of building new lines. FACTS, such as the unified power flow controller (UPFC), have also been regarded as controllers for routing power in the market-driven, deregulated power systems. Hitherto, the UPFC has been conceived to control the complex powers through a radial line. This paper presents the concept of a multi-terminal UPFC (M-UPFC), which serves to control the complex powers of several transmission lines converging towards (or radiating from) a transmission node. In order to show that a M-UPFC can be built, that it has stable operation and that it has all the control degrees of freedom of UPFCs, a laboratory model based on 3 units of 3-phase, voltage-source converters has been assembled and tested.

Keywords: electricity supply industry; flexible AC transmission systems; load flow control; power system control