

Voltage support provided by STATCOM in unbalanced power systems

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Abstract-

The presence of an unbalanced voltage at the point of common coupling (PCC) results in the appearance of a negative sequence current component that deteriorates the control performance. Static synchronous compensators (STATCOMs) are well-known to be a power application capable of carrying out the regulation of the PCC voltage in distribution lines that can suffer from grid disturbances. This article proposes a novel PCC voltage controller in synchronous reference frame to compensate an unbalanced PCC voltage by means of a STATCOM, allowing an independent control of both positive and negative voltage sequences. Several works have been proposed in this line but they were not able to compensate an unbalance in the PCC voltage. Furthermore, this controller includes aspects as antiwindup and droop control to improve the control system performance.

Index Terms- PCC voltage control; STATCOM; unbalanced voltage

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