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# Sequential Technique Based AC-DC Power Flow Analysis for Medium and Long Transmission Systems

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## Abstract:

The modern electric utility industry is currently more and more attention to HVDC transmission as a practical alternative to HVAC transmission. It is useful supplement to rapid and smooth power flow control, more economical choice and small power loss for long transmission systems. An electric power system with DC links requires a special analysis for power flow study that takes their characteristics into account. This paper presents an AC-DC load flow algorithm to solve a power flow problem with DC links. This algorithm is tested using medium and long transmission standard test systems. Digital results using the proposed sequential method are compared with a previous work. The effect of load change in HVDC control parameters is studied. A comparison between HVAC and HVDC transmission systems based on power losses are also performed.

## Keywords:

HVDC, sequential method, load flow AC-DC, power losses, load change, MATLAB SIMULINK.

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( 2 )

# Analysis and Control of HVDC Transmission Power System

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## Abstract:

This paper presents a design of converter controllers and filters of Line Commutated Converter High voltage direct current (LCC-HVDC) power transmission system to increase loadability and reliability of long power transmission. Also the proposed tuned PI controllers for HVDC Converters are verified in sense of HVDC transmissionsystem performance and reliability. The studied system performances are compared with HVAC transmission systems in terms of power transfer quantity and reliability for a wide range of transmission distances and operating conditions. The Power Quality of HVDC transmission system is studied with Filters and proposed PI controllers .The two transmission systems (HVDC & HVAC) are simulated using MATLAB SIMULINK software package. With the control strategy, the HVDC system can provide a useful and economical way to transmit electric power over the long distance compared with HVAC system.

## Keywords:

LCC\_HVDC, HVAC, modeling, steady state, power losses, harmonic analysis, MATLAB SIMULINK

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( 3 )

# HVDC FACTS Controller for Load Frequency Control System

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## Abstract:

Power system frequency deviation is always presented result to the continuous loads variation, thus leading to build the load frequency control (LFC) systems. In this paper, HVDC systems are used to suppression such this frequency oscillations which occur result to load variation between two-area interconnected systems. A comparative evaluation between HVDC and superconducting magnetic energy storage (SMES) are introduced in this paper to make a comparative study between different controllers to improve the dynamic performances of the power system. Two-Area Power system with AC/DC parallel tie lines is simulated and then it is subjected to different disturbances. Responses of frequencies deviation, AC tie line powers deviation and area control errors have been plotted for two areas. The system Dynamic performance using HVDC FACTS Controller is superior with fast response and less overshoot/undershoot.

## Keywords:

loads variation, LFC, dynamic, PI, HVDC, SMES

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