



多回高压直流输电线路离子流场计算方法
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摘要：提出不借助Deutsch 假设求解直流离子流场特性的主要方程的新方法。此方法以迎风差分算法为基础，迭代计算至空间电荷密度至满足Kaptzov 假设为止，并在迭代过程中考虑了分裂导线和地线的影响。文中用此方法对双回±500 kV双极高压直流线路离子流场进行了仿真计算，结果表明，为降低地面合成电场和离子流密度，各回线路应当水平布置，并且取相同的极性排列方式。

关键词：高压直流；多回输电线路；离子流场；仿真；迎风差分算法；离子流密度

Calculation of the Ion Flow Field under Multi-Circuit DC Transmission Lines

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Abstract: A new method for solving the equations of the ion flow field under DC transmission lines is proposed without application of Deutsch assumption. Based on the upwind difference algorithm, this method is solving the equations of electric field and space charge density in an iterative way until Kaptzov assumption is satisfied. Bundle conductors and ground wires are taken into account in the process. The ion flow field of a ±500 kV HVDC project with bipolar lines on the same tower is simulated by using the proposed method. Results indicate that the two circuits should be arranged horizontally with identical polarities to suppress the ground level electric field and the ion current density.

Key words: HVDC; multi-circuit transmission line; ion flow field; simulation; upwind difference algorithm; ion current density

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