电力系统

AC/DC系统的一类微分代数模型

庄慧敏　肖建

西南交通大学电气工程学院　西南交通大学电气工程学院

摘要：　目前普遍使用的AC/DC系统的微分代数模型主要存在2大缺陷：①随着直流线路的增加可能出现"维数灾难"问题；②不易处理直流控制方式的切换，计算繁杂。针对这一问题，提出一种新的建模方法。该方法基于消元思想，先将换流器消耗的功率作为依赖于电压的负荷，求解直流系统方程，消除直流变量后，再建立AC/DC系统的微分代数方程(differential algebra equation，DAE)模型。该方法建立的交直流DAE模型不含直流变量，容易处理直流控制方式的切换，计算量小，计算速度快。此外，基于此模型讨论电压稳定的鞍结分岔点的计算。最后通过一个3机3母线的AC/DC系统算例和一个双馈入直流线路算例验证该建模方法的有效性。

关键词：　AC/DC系统　微分代数模型　消元思想　崩溃点法　鞍结分岔

A Kind of Differential Algebraic Models of AC/DC Power System

Abstract: There are two main disadvantages in the present differential algebra equation(DAE) model used in AC/DC system: one is that 'dimensional calamity' can occur with the increment of DC transmission lines; another is that it is difficult to deal with the switch of DC control mode. To overcome the question, a novel modeling method is presented in this paper. Power consumed by the converts is used as the load dependent voltage in this method. DC system equations are first solved to eliminate DC variables, then DAE model is found. In addition, the method to calculate saddle node bifurcation (SNB) point of voltage profile is discussed. The proposed method has been applied to a three-generator-and-three-bus AC/DC system to illustrate its effectiveness.

Keywords: AC/DC system　differential algebra equation model　elimination　point of collapse method　saddle node branch

通讯作者：庄慧敏

作者简介：

作者Email: zhmcyj@163.com

参考文献：

本刊中的类似文章