

电力系统

基于在线最小二乘支持向量机回归的电力系统暂态稳定预测

吴琼¹; 杨以涵¹; 刘文颖¹

华北电力大学电力系统保护与动态安全监控教育部重点实验室¹

收稿日期 2007-5-23 修回日期 网络版发布日期 2007-12-5 接受日期

摘要

提出了一种基于在线最小二乘支持向量机回归的电力系统暂态稳定预测方法。分析了标准最小二乘支持向量机回归算法用于在线预测时存在的主要问题, 然后根据分块矩阵求逆定理对标准算法进行改进, 实现支持向量的递推式求解, 提高了算法的学习效率。为了满足实际多机系统在线稳定预测的要求, 引入轨迹聚合技术对多机轨迹进行聚合, 进一步减少了计算量。在轨迹降阶的基础上, 根据EEAC理论, 通过识别聚合轨迹的动态鞍点来判断轨迹的稳定性。最后, 以电科院7机系统和我国西北电网为例进行仿真分析, 从预测精度和计算时间两方面验证了方法的有效性。

关键词 [暂态稳定预测](#) [电力系统](#) [支持向量机](#) [统计学习](#)

分类号 [TM74](#)

ELECTRIC POWER SYSTEM TRANSIENT STABILITY PREDICTION BASED ON ON-LINE LEAST SQUARES SUPPORT VECTOR MACHINE

Abstract

A power system transient stability prediction method based on on-line least squares support vector machine (LS-SVM) was proposed. Firstly, Deficiencies of applying the standard LS-SVM to on-line prediction were specified. Based on the theorem of inverting block matrix, the support vectors were calculated in recursive formula, and learning efficiency was enhanced. In order to satisfy the on-line transient stability prediction of multi-machine system, polymerization technology of trajectories was used to reduce the computing burden. Based on the theory of EEAC, transient stability of power system was estimated by identifying the dynamic saddle point (DSP). According to the simulation results of 7-machine system of china electric power research institute (CEPRI) and northwest power grid of china, the validity of proposed method was proved in respects of prediction precision and computing time.

Key words [transient stability prediction](#) [electric power system](#) [support vector machine](#) [machine learning](#)

DOI :

通讯作者 吴琼 bjwq7972@126.com

作者个人主页 吴琼 杨以涵 刘文颖

扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [PDF \(309KB\)](#)
- ▶ [\[HTML全文\]\(OKB\)](#)
- ▶ [参考文献\[PDF\]](#)
- ▶ [参考文献](#)

服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

相关信息

- ▶ [本刊中 包含“暂态稳定预测”的相关文章](#)
- ▶ 本文作者相关文章

- [吴琼](#)
- [杨以涵](#)
- [刘文颖](#)