

[Hide Expanded Menus](#)

盛敬, 魏民祥, 刘国满, 李玉芳. 基于内禀模态高频积分能量法的煤油发动机爆震因子计算方法[J]. 航空动力学报, 2014, 29(3): 504~510

基于内禀模态高频积分能量法的煤油发动机爆震因子计算方法

Calculating method of knock factors based on method of intrinsic mode function high-frequency integral energy for kerosene engine

投稿时间: 2013-06-05

DOI: 10.13224/j.cnki.jasp.2014.03.004

中文关键词: [爆震因子](#) [内禀模态高频积分能量法](#) [缸内燃烧压力](#) [爆震窗口宽度](#) [电控二冲程煤油发动机](#)

英文关键词: [knock factors](#) [method of intrinsic mode function high-frequency integral energy](#) [cylinder combustion pressure](#) [knock window width](#) [electronic controlled two-stroke kerosene engine](#)

基金项目: 南京航空航天大学基本科研业务费专项基金 (NS2012.37)

作者	单位
盛敬	南京航空航天大学 能源与动力学院, 南京 210016 ; 南昌工程学院 机械与电气工程学院, 南昌 330099
魏民祥	南京航空航天大学 能源与动力学院, 南京 210016
刘国满	中兴通讯股份有限公司 承载网预研部, 南京 210012
李玉芳	南京航空航天大学 能源与动力学院, 南京 210016

摘要点击次数: 85

全文下载次数: 154

中文摘要:

提出了基于内禀模态高频积分能量法的爆震因子计算方法. 该方法对电控二冲程煤油发动机缸内燃烧压力信号进行经验模态分解, 自适应得到若干内禀模态函数分量与残余函数. 对内禀模态函数分量采用快速傅里叶变换得到爆震高频信号分量, 选取残余函数峰值对应的曲轴转角为爆震窗口起始曲轴转角, 对爆震窗口宽度分析, 得到合理爆震窗口宽度持续曲轴转角为 30° . 利用内禀模态高频积分能量法对无爆震、轻微爆震、中度爆震与强烈爆震工作循环的缸内燃烧压力信号进行爆震因子计算, 得到4个工作循环的爆震因子分别为0.6642, 1.8191, 3.0275, 5.3717, 可表征爆震的强弱. 研究表明基于内禀模态高频积分能量法的爆震因子计算方法简便、快速有效.

英文摘要:

The method of intrinsic mode function high-frequency integral energy was proposed. In this method, the cylinder combustion pressure signals of the electronic controlled two-stroke kerosene engine were decomposed into a finite number of intrinsic mode function components and the residual function using the empirical mode decomposition method. The knock high frequency signal component was obtained by analyzing the intrinsic mode function components using the fast Fourier transform(FFT). The crank angle corresponding to the peak of the residual function peak was chosen as the starting crank angle of the knock window. Then the knock factors were calculated using the method of intrinsic mode function high frequency integral energy based on the knock high frequency signal component. By analyzing the knock window width, it's learnt is that a reasonable constant crank angle of knock window width is 30° . Knock factors of cylinder combustion pressure signals for four cycles were calculated using the method of intrinsic mode function high-frequency integral energy. Four cycles include non-knocking cycle, slight knock cycle, moderate knock cycle and strong knock cycle. The knock factors of four cycles include 0.6642, 1.8191, 3.0275 and 5.3717, which could represent the strength of knock. Research shows that the method of intrinsic mode function high-frequency integral energy in the process of knock factors calculation for the electronic controlled two-stroke kerosene engine is practical and effective.

[查看全文](#) [查看/发表评论](#) [下载PDF阅读器](#)

关闭

友情链接: [中国航空学会](#) [北京航空航天大学](#) [EI检索](#) [中国知网](#) [万方](#) [中国宇航学会](#) [北京勤云科技](#)

您是第6118842位访问者

Copyright© 2011 航空动力学报 京公网安备110108400106号 技术支持: 北京勤云科技发展有限公司