

光电系统与工程

连续变焦距镜头结构设计及焦距实时输出分析

乔健;曹立华;崔爽;施龙;张磊

中国科学院长春光学精密机械与物理研究所, 吉林长春130033

摘要:

机械补偿式变焦距镜头以其自身的优点受到了广泛的关注和应用。介绍机械补偿式三组元连续变焦系统的基本工作原理及组成, 根据实际使用要求, 设计出保证变倍过程中变倍组和补偿组按一定函数规律运动的圆柱凸轮结构、导向机构及相应的加工工艺, 从变倍运动方程和设计的变焦结构形式出发, 分析变焦过程中焦距实时输出的实现方法和存在的问题, 并提出相应的解决措施, 对焦距值实时输出精度的提高以及变焦距镜头的设计和装调具有借鉴作用。

关键词: 变焦距系统 机械补偿 凸轮机构 焦距实时输出

Mechanical design of zoom lens and analysis of its focal length

QIAO Jian;CAO Li-hua;CUI Shuang;SHI Long;ZHANG Lei

Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences, Changchun 130033, China

Abstract:

Zoom optical systems with mechanical compensation are widely used in all kinds of optical instruments due to its unique advantages. The structures and principle of mechanical compensation zoom optical systems with 3-unit were briefly described. Cam mechanism and guide mechanism to improve the image quality of zoom optical system were discussed. Actual focal length output with changing focal length was analyzed, including implementation of focal length output and some problems. It is shown that proposed methods are feasible for improving the design and adjustment of zoom optical lens, in addition, the accuracy of actual focal length output at different focal length is improved significantly.

Keywords: zoom optical system mechanical compensation cam mechanism focal length

收稿日期 修回日期 网络版发布日期

DOI:

基金项目:

通讯作者: 乔健(1980-), 男, 山西忻州人, 博士, 助理研究员, 主要从事现代光电仪器结构设计等相关方面的研究。

作者简介:

作者Email: qiaojj99065@163.com

参考文献:

[1] 王一凡, 薛育. 一种大口径高精度凸轮变焦机构的设计 [J]. 光学精密工程, 2007, 15(11): 1756-1759. WANG Yi-fan, XUE Yu. Design of heavy caliber and high precision cam-varifocal mechanism [J]. Optics and Precision Engineering, 2007, 15(11): 1756-1759. (in Chinese with an English abstract)
[2] ARTHUR COX J, CALDWELL B. Tracking zoom lens: a survey of zoom lenses [J]. SPIE, 1997, 3129: 2-12.

扩展功能

本文信息

- Supporting info
PDF(1434KB)
[HTML全文]
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
引用本文
Email Alert
文章反馈
浏览反馈信息

本文关键词相关文章

- 变焦距系统
机械补偿
凸轮机构
焦距实时输出

本文作者相关文章

- 乔健
曹立华
崔爽
施龙
张磊

PubMed

- Article by Qiao, J.
Article by Cao, L. H.
Article by Cui, S.
Article by Shi, L.
Article by Zhang, L.

- [3] 白瑜, 杨建峰, 阮萍.长波红外连续变焦光学系统设计 [J] .光电技术应用, 2008, 23(5): 15-17, 21.
BAI Yu, YANG Jian-feng,RUAN Ping. Design of long wavelength infrared continuous zoom optical system [J] .Electro-optic Technology Application, 2008, 23(5): 15-17, 21.(in Chinese with an English abstract)
- [4] 刘崇进, 史光辉.机械补偿法变焦镜头三个发展阶段的概况和发展方向 [J] .应用光学, 1992, 13(2): 12-13.
LIU Chong-jin, SHI Guang-hui. General situations of mechanical compensation zoom lens in its three development phases and its developing direction [J] . Journal of Applied Optics,1992,13(2):12-13.(in Chinese with an English abstract)
- [5] 梁来顺.变焦距系统设计的快速求解 [J] .应用光学, 2004, 25(1):17-20.
LANG Lai-shun. A rapid computing method of zoom optical design [J] . Journal of Applied Optics, 2004,25(1):17-20.(in Chinese with an English abstract)
- [6] 张存武.变焦距光学系统设计 [D] .长春: 长春理工大学, 2006: 25-45.
ZHANG Cun-wu. Design of zooming optical system [D] . Changchun University of Science and Technology, 2006: 25-45.(in Chinese)
- [7] 陈鑫, 付跃刚.变焦系统凸轮曲线的优化设计 [J] .应用光学, 2008, 29(1): 63-64, 74.
CHEN Xin, FU Yue-gang. Optimal design of cam curve for zoom system [J] . Journal of Applied Optics, 2008,29(1):63-64, 74. (in Chinese with an English abstract)
- [8] 孟军和, 张振, 孙兴文. 变焦距镜头的凸轮优化设计 [J] .红外与激光工程, 2002, 31(1): 51-54.
MENG Jun-he, ZHANG Zhen, SUN Xing-wen. Cam optimization of a zoom lens [J] . Infrared and Laser Engineering, 2002, 31(1): 51-54. (in Chinese with an English abstract)

本刊中的类似文章

1. 陈鑫;付跃刚.变焦系统凸轮曲线的优化设计[J]. 应用光学, 2008,29(1): 45-47
2. 宋家军;何平安.LCoS背投光学引擎中变焦投影物镜设计[J]. 应用光学, 2007,28(1): 58-62
3. 张良.中波红外变焦距系统的光学设计[J]. 应用光学, 2006,27(1): 32-34