

光学设计

CCD摄像机大视场光学镜头的设计

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摘要 为提高CCD摄像机的成像质量, 同时使镜头结构紧凑、小型化, 在大视场光学镜头的设计中, 引入标准二次曲面和偶次非球面。根据初级像差理论, 分析了非球面的位置、初始结构参数的求解规律。通过理论计算和ZEMAX光学设计软件的优化, 给出工作波长为0.4~0.7 μm 、全视场角为80°, 相对孔径为1:1.5的镜头设计实例。该镜头由7块镜片组成, 包括一个标准二次曲面和两个8次方非球面; 在40lp/mm空间频率处的MTF值超过0.85, 全视场畸变小于3%, 像质优良

关键词 [CCD摄像机](#) [大视场](#) [光学镜头](#) [非球面](#)

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Design of WFOV optical lens for CCD camera

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Abstract To improve the imaging quality of CCD camera and make the lens small in size, compact in structure, the wide field of view (WFOV) optical lens with the standard quadric surface and even aspheric surface was designed. According to the primary aberration theory, the position of aspheric surface and the solution law of initial structure parameters were analyzed. A design example of a lens whose operating wavelength was 0.4-0.7 μm , full field of view angle was 80° and relative aperture was 1:1.5 was given on the basis of the theoretical calculation and the optimization of optical design software ZEMAX. The MTF of the lens, which is composed of four spherical lenses and three aspheric lenses, is better than 0.85 at the spatial frequency of 40lp/mm. The full field of view distortion of the lens is less than 3%.

Key words [CCD camera](#) [wide field of view \(WFOV\)](#) [optical lens](#) [aspheric surface](#)

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