

## 制导、导航与控制

### 基于星敏感器的像移补偿技术

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摘要:

星敏感器在大角速度转动时引起的星像降质不能忽略, 采用了3种技术以补偿、消除这种影响。首先, 用姿态估计和共线方程预测星像块中心位置和长度。其次, 挑选视场内6~8个较亮的星像块, 以预测的星像块位置为搜索起始点, 块匹配算法可快速获得像素量级的像移, 建立像移模型。同时, 对相邻帧匹配的星像块的输出相加以提高信噪比。采用以上两项技术后, 只需处理星图像中很少一部分像素, 从而保证了实时性。最后, 采用空间域像移补偿法, 根据运动模糊的逆过程直接进行补偿, 并给出了仿真结果。

关键词: 星敏感器 像移补偿 块匹配

### Image motion compensation technology based on star sensor

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Abstract:

When the star sensor rotates with high dynamics, the weak energy of the star is spread on more pixels, the low signal-to-noise ratio (SNR) makes detection be difficult from single frame images and degrades the accuracy of the centroiding algorithm. A series of techniques intended to overcome this limitation is proposed. The first technique is to predict the position of stars and estimate the sub-window around a star. The second technique is to obtain the accurate velocity that the star image slides along the pixel array by a block matching algorithm with 6~8 stars in contiguity frames. The connectivity analysis of the pixels only deals with a small part of the image pixels in sub-window so as to ensure real-time ability. The third technique is to establish a motion compensation model. When stars sweep the pixels that the number of pixels is obtained by the first technique, the every value of grey scale of pixels expresses by several adjacent pixels instead of by itself, and the energy accumulation process is completed along the motion track of stars.

Keywords: star sensor image motion compensation block match

收稿日期 修回日期 网络版发布日期

DOI: 10.3969/j.issn.1001-506X.2012.07.24

基金项目:

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