

A PSF estimation method using gaussian mixtures

Abstract

It is widely accepted that a main challenge AO image post-processing is that the PSF information is not available or the PSF model does not accurately represent the optics system. The knowledge of optics system PSF is critical to estimate astrophysical signals from the corrected scientific images. In order to achieve an adequately correction or deconvolution of the AO images. It is essential to use an adequate PSF estimation.

The PSF estimation is a very difficult inverse problem, and our proposed PSF estimation method is based on transforming the inverse problem into an optimization problem to find the optics system PSF.

In this work we propose to model the PSF as a gaussian mixture, then using the equation 1 is possible to obtain a deconvolved or corrected image (Obj(x,y)).

$$\text{img}(x,y)=[\text{obj}(x,y)*\text{PSF}(x,y)] +\text{Noise}(x,y).$$

Using the Object-Oriented, Matlab & Adaptive Optics (OOMAO), we will simulate observed images (obj(x, y)) and real images (img(x, y)). Then using the proposed method we will estimate the PSF(x,y).