Wavefront sensor-less adaptive optics based on image sharpening for microscopy

We present an overview of a wavefront sensor-less adaptive optics scheme for microscopy based upon the optimisation of a image sharpening metric. Adaptive optics systems normally use a wave front sensor to measure aberrations, which are in turn corrected using an adaptive element. In imaging systems, however, direct wave front sensing is not straightforward .An alternative is the model-free optimization approach without wavefront sensor measuring wavefront to correct the distortions, which the phase correction is based on direct optimization of a system performance metric such as image quality. The control system in the wavefront sensorless system applies small perturbations to the deformable mirror and measures a performance metric that is inversely related to the wavefront error. The deformation that maximizes the performance metric is then found by using an optimization algorithm. A schematic illustration of this method for systems is shown that the system have good effect.