Stable projection (representation) of wavefronts on modes using regularization without truncation

Andreas Obereder[*][1]

[1]MathConsult GMBH (MathConsult) – Altenbergerstraße 69 A - 4040 Linz, Austria

Abstract

A modal representation of wavefronts is widely used in the Adaptive Optics community. However, in noisy conditions (bad seeing or low flux secenarios) one often has to truncate the number of used modes in order to get a stable closed loop performance. This leads to a lower wavefront representation quality and a decreased Stehl ratio.

We will present a regularization method which allows us to use all modes and still obtain a stable closed loop performance in all seeing conditions studied. In order to highlight the properties of this regularization we will show some open loop results. Random screens are projected on a set of modes and the according frequency distributions (i.e. the impact of the regularization) are compared for different regularization parameters.

In addition we will present closed loop results for a METIS like setting.

[*]Speaker