

On the extension of the Hager-Zhang conjugate gradient method for vector optimization

Leandro da Fonseca Prudente¹, Max Leandro Nobre Gonçalves²

^{1,2} UFG

The extension of the Hager-Zhang (HZ) nonlinear conjugate gradient method for vector optimization will be discussed in the talk. In the scalar minimization case, this method generates descent directions whenever, for example, the line search satisfies the standard Wolfe conditions. We will first show that, in general, the direct extension of the HZ method for vector optimization does not yield descent (in the vector sense) even when an exact line search is employed. By using a sufficiently accurate line search, we will then propose a self-adjusting HZ method which possesses the descent property. This method with suitable parameters reduces to the classical one in the scalar minimization case. Global convergence of the new scheme can be proved without regular restarts and any convex assumption. Finally, numerical experiments illustrating the practical behavior of the approach and comparisons with the Hestenes-Stiefel conjugate gradient method will be discussed.