BLIND CHANNEL EQUALIZATION WITH ALGEBRAIC OPTIMAL STEP SIZE (MonPmPO1)

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Abstract :

The constant modulus algorithm (CMA) is arguably the most widespread iterative method for blind equalization of digital communication channels. The present contribution studies a recently proposed technique aiming at avoiding the shortcomings of conventional gradient−descent implementations. This technique is based on the computation of the step size leading to the absolute minimum of the CM criterion along the search direction. For the CM as well as other equalization criteria, this optimal step size can be calculated algebraically at each iteration by finding the roots of a low−degree polynomial. After developing the resulting optimal step−size CMA (OS−CMA), the algorithm is compared to its conventional constant step−size counterpart and more recent alternative CM−based methods. The optimal step size seems to improve the conditioning of the equalization problem as in prewhitening (e.g., via a prior QR decomposition of the data matrix), although it becomes more costly for long equalizers. The additional exploitation of the i.i.d. assumption through prewhitening can further improve performance, an outcome that had not been clearly interpreted in former works.

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