

Complementarity Problems with Band Structure

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Let $F : \mathbb{R}^n \rightarrow \mathbb{R}^n$ be a given mapping. A complementarity problem $CP(F)$ is to find a vector x^* such that

$$x^* \geq 0, \quad F(x^*) \geq 0, \quad (x^*)^T F(x^*) = 0.$$

In applications the mapping F has very often the form

$$F(x) = Mx + \varphi(x),$$

where $M \in \mathbb{R}^{n \times n}$ and where φ is a nonlinear mapping.

In this talk we do not make any assumptions concerning the appearance of the components of the vector $x = (x_i)$ in the components φ_i of φ . In the applications, however, we specialize the mapping φ to a so-called band mapping, where for each i only a limited number of components of x , concentrated around x_i , appear. These mappings have in a natural sense a certain bandwidth, which is similarly defined as for matrices. They appear if certain free boundary problems are solved numerically. We compute error bounds for $CP(F)$.