Existence and uniqueness tests to solve image evaluation problem.

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Abstract. The problem to be considered is the characterization of the set

\[ S = \{ p \in \mathbb{R}^m, \exists x \in [x] \subset \mathbb{R}^n, f(p, x) = 0 \}. \]

where \( \dim(x) = \dim(f) \). We shall consider the case where \([x]\) is small but where \( \dim x \) is large whereas \( \dim p \) is small. As a consequence, we want to avoid any bisection over the \( x \)-space. The set \( \mathbb{R}^m \) will be partitioned into four zones. The first zone contains points that are outside \( S \). The second zone contains \( p \in S \) such that there exists a unique \( x \) that satisfies the equations. The third zone contains \( p \in S \) such that the unicity of the corresponding \( x \) is not proved. The last zone contains \( p \) for which nothing has been proved.

Exemples from [MB79], [JKDW01], [GJ06] are presented in order to show the efficiency of the approach.

References

