

Abstract

Several generalizations of the traditional Tikhonov-Phillips regularization method have been proposed during the last two decades. Many of these generalizations are based upon inducing stability throughout the use of different penalizers which allow the capturing of diverse properties of the exact solution (e.g. edges, discontinuities, borders, etc.). However, in some problems in which it is known that the regularity of the exact solution is heterogeneous and/or anisotropic, it is reasonable to think that a much better option could be the simultaneous use of two or more penalizers of different nature. Such is the case, for instance, in some image restoration problems in which preservation of edges, borders or discontinuities is an important matter. In this work we present some results on the simultaneous use of penalizers of L^2 and of bounded variation (BV) type. For particular cases, existence and uniqueness results are proved. Open problems are discussed and results to signal restoration problems are presented.