关于一类广义Tikhonov正则化方法的饱和效应分析

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摘要　　Tikhonov正则化方法是研究不适定问题最重要的正则化方法之一, 但由于这种方法的饱和效应出现的太早,

使得无法随着对解的光滑性假设的提高而提高正则逼近解的收敛率, 也即对高的光滑性假设,

正则解与准确解的误差估计不可能达到阶数最优. Schr\"oter T和Tautenhahn U给出了一类广义Tikhonov

正则化方法并重点讨论了它的最优误差估计, 但却未能对该方法的饱和效应进行研究. 本文对此进行了仔细分析,

并发现此方法可以防止饱和效应, 而且数值试验结果表明此方法计算效果良好.

关键词　　不适定问题　Tikhonov正则化　饱和效应　广义Tikhonov正则化

分类号

THE ANALYSIS OF THE SATURATION EFFECT FOR A CLASS OF GENERAL TIKHONOV REGULARIZATION

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Abstract Tikhonov regularization is one of the most important regularization methods for the study of ill-posed problems. But because of the saturation effect of this method, it is impossible to improve the convergence rate of the approximate solution with increasing smoothness assumption of solutions, i.e., the error estimate between the exact and approximate solutions can not be order optimal for sharp smoothness assumption. A general Tikhonov regularization has been given by Schr\"oter T and Tautenhahn U, and the optimal error estimates have been considered. In this paper the further research shows that this regularization method can prevent the saturation effect and the numerical experiment works well.

Key words ill-posed problem　Tikhonov regularization　saturation effect　general Tikhonov regularization

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