

Regularizing algorithms for image restoration

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Abstract: Image processing and restoration are very good and important for practice examples of 2D and 3D inverse problems. Mostly, such problems are ill-posed. In this paper we will discuss how to construct and apply regularizing algorithms for solving following problems: 1) Image processing in astronomy. As an example we will consider image processing of the gravitational lens «Einstein cross» [1]. 2) Image processing in digital photography. We will consider restoration of defocused and smeared images [2-3]. 3) Constructing magnetic image of a ship using measurements of a magnetic field by magnetic sensors. In most general case it is necessary to solve 3D integral equations of the 1st kind by parallel computers [4]. We will consider also geophysical applications. 4) Ring artefact suppression in X-ray tomography [5]. 5) Restoring the signals from an electronic microscope in the backscattered electron mode [6]. Methods for solving these inverse problems are based on regularization technique proposed in [7] and all available a priori information.

Keywords: inverse problems, ill-posed problems, regularization, image processing.

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