

## **Space-variant directional regularisation for image restoration problem**

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We proposed a space-variant and directional variational regularisation for image restoration problems based on the statistical assumption that the gradient magnitude of the objective image is distributed at any pixel according to a bivariate generalised Gaussian distribution. Compared to standard regularisers, this proposed one is highly flexible as it is defined in terms of space-variant parameters describing local image geometry and orientation preferences via a combination of an anisotropic and a variable-exponent modelling possibly making the model non-convex. For an automatic estimation of such parameters, we propose a robust maximum likelihood approach and verify empirically its reliability on synthetic and natural imaging data. The numerical solution of the corresponding image restoration model by means of the Alternating Direction Method of Multipliers (ADMM) for which an efficient calculation of a non-convex proximal step is required. The proposed model outperforms related competing methods in terms of image quality and, due to its directional behaviour, improves reconstruction qualities in terms of texture and detail preservation. This is joint work with A. Lanza, M. Pragliola and F. Sgallari (University of Bologna, Italy).