

Simultaneous Structure and Texture Image Restoration with Higher-order Regularizer

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ABSTRACT

This article introduces color image decomposition and restoration models, aiming at recovering an image from its degraded version and decomposing the image into cartoon and texture components. The energy involves adaptive higher-order regularizers, incorporated with an edge indicator function. This not only helps cartoon and texture decomposition but provides higher quality of image restoration, by ameliorating the staircasing effect that arises in the total variation regularization methods. To solve the proposed models, we present fast and efficient iterative algorithms based on the variable splitting scheme and the augmented Lagrangian method. A convergence analysis of the proposed algorithms is also presented. Numerical results and comparisons demonstrate the proposed model is more effective for both image decomposition and restoration than the state-of-the-art models.

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