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A Novel Nonlinear Parabolic Approach with $p(t, x)$ -Growth Conditions for Image Super-Resolution.

Communication Info

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- (1) singular parabolic equation.
- (2) Image super-resolution.
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Abstract

In this research article, we will introduce a new parabolic model based on a nonlinear operator with space and time-dependent variable exponent $p(t, x)$ that can be used for multi-frame image super-resolution.

The basic concept is to improve classical super-resolution models by incorporating modern regularization techniques that account for nonstandard $p(t, x)$ -growth conditions. This allows for a better description of the local structure and movement of the image, improving both edge retention and the ability to reconstruct fine details. Our first step is to assess our model's theoretical solvability. We use Lebesgue-Sobolev spaces with variable exponents to identify the functional spaces appropriate for the theoretical analysis of the model we propose. The existence and uniqueness of a strong solution for the model are then established using the Galerkin method.

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