Many noisy texture images require the enhancement of coherent structures in various applications. Traditional TV-based methods make the denoising fail when the data-fitting weight parameter \( \lambda \) is strong, on the contrary, reducing the corresponding parameter \( \lambda \) may distort the textures, and generate staircase artifacts. Therefore in order to smooth the image efficiently, the suitable \( \lambda \) shall be adopted. Formally minimizing the TV-based energy functional yields the associated Euler-Lagrange equation, which can be seen as a reaction-diffusion system, in general the corresponding parameter \( \lambda \) with respect to reaction term is always small to ensure sufficiently removal of the noise, and this feature has the contrast between coherent structures and the background decreased. Hence in this paper a reaction-diffusion system is investigated applied to image restoration with additional source term embedded into the system. Subsequently, this new model combines contrast enhancement with diffusion processes, so it may be more suitable for dealing with Gaussian white noise than the original models. The proposed method is assessed in terms of the theoretical and numerical properties changed by the source term. Finally, An experimental result is also given to demonstrate the efficiency of
this kind of model.

References


**Index Terms**

Computer Science

Image Processing

**Keywords**

Image restoration, Reaction-diffusion system, Source term, Texture enhancement