

Among various studies for color image denoising, the methods based on the chromaticity-brightness decomposition are known to result in relatively better restored images. This article begins with a generalization of the chromaticity-brightness model in the angle domain, hybridizing the total-variation minimization and the mean-curvature flow. For a reliable preservation of the edges, we suggest a new finite difference method for the approximation of the gradient magnitude, called the essentially non-dissipative (ENoD) scheme. An incomplete Crank-Nicolson procedure is adopted for the time integration and the alternating direction implicit (ADI) method is applied for an efficient simulation of the model. Strategies for the optimal timestep size is studied (1) to reduce a pre-determined range of frequency components more efficiently than other components in the image and (2) to stop the denoising iteration automatically. The resulting algorithm, the CN-ADI procedure incorporating ENoD, has shown excellent numerical features, in particular, in edge-preservation. The algorithm can complete the denoising in 2-5 iterations for most of highly-noised images. Numerical results are presented to numerically verify the claims.