A Chromaticity-Brightness Model for Color Images Denoising in a Meyer’s “u + v” Framework

Abstract
A variational model for imaging denoising aimed at restoring color images is proposed. The model combines Meyer’s “u+v” decomposition with a chromaticity-brightness framework, and is expressed in terms of a minimization of energy integral functionals depending on a small parameter $\varepsilon > 0$. The asymptotic behavior as $\varepsilon \to 0^+$ is characterized, and convergence of infima, almost minimizers, and energies are established. In particular, an integral representation of the lower semicontinuous envelope, with respect to the $L^1$-norm, of functionals with linear growth and defined for maps taking values on a compact manifold is provided.