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Marcelo Bertalmío* (marcelo.bertalmio@upf.edu), Universitat Pompeu Fabra, Pg. de Circumvallacio 8, 08003 Barcelona, Spain. *A continuous interpretation of the original Retinex model.*

The original Retinex theory of Land and McCann aims at reproducing the sensory response of color by the Human Visual System (HVS). Besides color vision purposes Retinex is widely used as an image enhancer, removing color cast and enhancing contrast. In this talk we propose a new continuous interpretation of Retinex that has several advantages with respect to the discrete one.

First, by expressing Retinex in a continuous form we can now achieve a deep understanding of the algorithm (regarding convergence, its action on image properties like contrast and variance, etc.)

Second, the color enhancement results obtained with this new formulation do not suffer from the visual artifacts that appeared with the original algorithm due to the use of *image paths*.

Third, the new continuous formulation can be approximated in order to reduce its computational complexity from $O(N^2)$ to $O(N \log N)$, being N the number of input pixels.

And finally, this continuous equation for Retinex shows a remarkable analogy to the classical computational neuroscience Wilson-Cowan equation, which models the average activity of neuron populations in the visual cortex. This result would suggest a biological correlate, taking place at the cortex, for the Retinex algorithm. (Received January 30, 2008)