

# Structurally adaptive mathematical morphology on nonlinear scale-space pyramids

Jesús Angulo, Santiago Velasco-Forero

CMM - Centre de Morphologie Mathématique,  
Mathématiques et Systèmes, MINES ParisTech;  
jesus.angulo, santiago.velasco@ensmp.fr;  
<http://cmm.ensmp.fr/~angulo>

33ème journée ISS France - 4 février 2010

## Abstract

Standard formulation of morphological operators is translation invariant in the space and in the intensity: the same processing is considered for each point of the image.

A current challenging topic in mathematical morphology is the construction of adaptive operators. In previous works, the adaptive operators are based either on spatially variable neighbourhoods according to the local regularity, or on size variable neighbourhoods according to the local intensity.

This paper introduces a new framework: the structurally adaptive mathematical morphology. More precisely, the rationale behind the present approach is to work on a nonlinear multi-scale image decomposition, and then to adapt intrinsically the size of the operator to the local scale of the structures.

The properties of the derived operators are investigated and their practical performances are compared with respect to standard morphological operators using natural image examples.

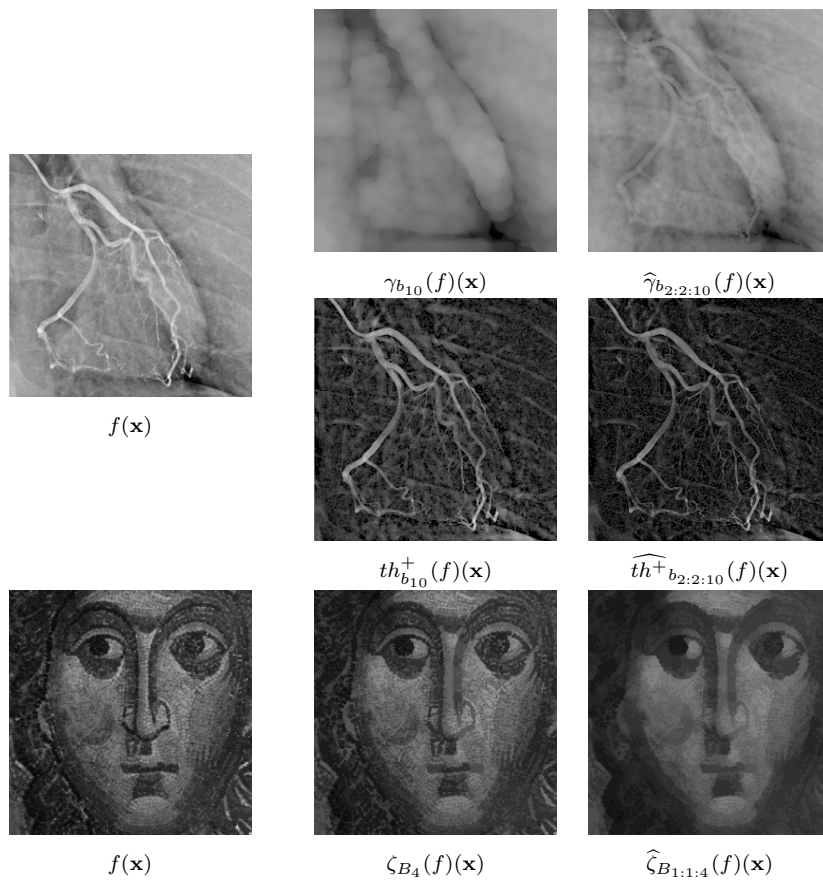


Figure 1: Two applications (see the text for details): Top, image detail extraction using the white top-hat; bottom, image filtering/denoising using morphological center.