

UNIVERSITY OF MACAU
FACULTY OF SCIENCE AND TECHNOLOGY
DEPARTMENT of MATHEMATICS

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**“Total Variation Method for Multiplicative
Noise Removal”**

by

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Date : 19/05/2010 (Wednesday)
Time : 10:30-12:00AM
Venue : J308

Abstract

In this talk, we consider a total variation (TV) minimization method for multiplicative noise removal problems. Unlike additive noise removal problems, the noise is multiplied to the original image, so almost all information of the original image may disappear in the observed image. The main aim of this talk is to propose and study a strictly convex objective function for multiplicative noise removal problems. We use a logarithmic function to convert the multiplicative noise into additive noise. We also incorporate the modified total variation regularization in the objective function to recover image edges. We develop an alternating minimization algorithm to find the minimizer of such an objective function efficiently and also show the convergence of the minimizing method. Our experimental results show that the quality of images denoised by the proposed method is quite good.

Biography

Educational Background

- 9/1998–7/2001 Master, Faculty of Computer Science, Guangdong University of Technology, Guangzhou, China
- 9/2003–8/2006 Ph.d, Department of Mathematics. The University of Hong Kong, Hong Kong, China

Working Experience

- 1/2008– Visiting Research Scientist, CWAIP, Temasek Laboratories, National University of Singapore, Singapore
- 1/2007– Associate Professor, Department of Mathematics, South China Agricultural University, P.R.China.

Publications

1. Five most representative publications in recent five years

- (a) R.Chan, **Y. Wen** and A. Yip, *A Fast Optimization Transfer Algorithm for Image Inpainting in Wavelet Domains*. IEEE Trans. Image Process., Vol.18(7), pp:1467–1476, 2009.
- (b) Y. Huang, M. Ng and **Y. Wen**, *A New Total Variation Method for Multiplicative Noise Removal*. SIAM Journal on Imaging Sciences, Vol.2(1), pp:20-40, 2009.
- (c) **Y. Wen**, M. Ng and Y. Huang, *Efficient Total Variation Minimization Methods for Color Image Restoration*. IEEE Trans. Image Process., Vol.17(11), pp:2081-2088, 2008.
- (d) Y.Huang, M.Ng and **Y. Wen**, *A Fast Total Variation Minimization Method for Image Restoration*. SIAM Multiscale Modeling and Simulation, Vol.7(2), pp:774-795, 2008.
- (e) **Y. Wen**, M.Ng and W.Ching, *Iterative Algorithms Based on the Decouple of Deblurring and Denoising for Image Restoration*, SIAM Journal on Scientific Computing. Vol.30(5), pp:2655-2674, 2008.

2. Four representative publications beyond the recent five-year period

- (a) **Y. Wen**, M. Ng, W. Ching and H. Liu, *A Note on the Stability of Toeplitz Matrix Inversion Formulas*, Applied Mathematics Letter, Vol.17(8), 2004, pp:903–907.
- (b) **Y. Wen**, M. Ng and W.Ching, *High -Resolution Image Reconstruction from Rotated and Translated Low-Resolution Images with Multisensors*, International Journal of Imaging Systems and Technology, Vol.14(2), 2004, pp:75–83.
- (c) **Y. Wen**, W. Ching and M. Ng, *Explicit preconditioners for Toeplitz Systems*, International Journal of Applied Mathematics, Vol.13 (1), 2003, pp: 83-98.
- (d) M. Ng, K. Rost and **Y. Wen**, *On Inversion of Toeplitz Matrices, Linear Algebra and its Applications*, Vol.348(1-3), 2002, pp:145-151.

ALL ARE WELCOME!