A Toeplitz-matrix based approach deblurring an image

A. Danelakis, M. Mitrouli and **D. Triantafyllou**
Department of Mathematics, University of Athens
Panepistimiopolis 15784, Athens, Greece
dtriant@math.uoa.gr

In this paper, we study the problem of image deblurring which arises in Image Processing and Computer Graphics. More precisely, we study the deblurring of a blurred image in one and two dimensions. We propose a new, fast, based on matrices of special form, method, deblurring the initial blurred image in a stable way, reducing per one order the required computational complexity. For this purpose we modify the algorithm proposed in [3] in order to take advantage of the special form of Toeplitz matrices that we use. Through the study of the error analysis of our method we prove its stability using orthogonal transformations. Known algorithms approaching the problem using Discrete Fourier Transformations (DFT) [1, 2] are sensitive in numerical computations. We compare our method with these ones, concluding to useful results, which concern both the stability as the complexity of the algorithms. The proposed procedures are tested using real examples.

References

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