



Πανεπιστήμιο Ιωαννίνων/University of Ioannina

Τμήμα Μαθηματικών/Department of Mathematics



ΕΒΔΟΜΑΔΙΑΙΑ ΣΕΜΙΝΑΡΙΑ ΤΜΗΜΑΤΟΣ ΜΑΘΗΜΑΤΙΚΩΝ
WEEKLY SEMINAR OF THE DEPARTMENT OF MATHEMATICS

A New Blind Source Separation Numerical Technique

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Digital Document Restoration (DDR) consists of a set of processes finalized to the visual and aesthetic improvement of a virtual reconstruction of the document. By DDR a document can be analyzed without deteriorating it. Main degradation types are: Bleed-through, that is a physical phenomenon due to the ink infiltration from the opposite side of a page; show-through, that is an effect due to the scanning process and the paper transparency. We deal here with the problem of estimating the original sources from two data mixtures of these sources produced by the bleed through or the show through effect. This problem belongs to the Blind Source Separation (BSS) class of problems. We assume that the mixture model is linear. This assumption is not always verified in the real cases, anyway it is essential to construct the basement of more complex models. The data images that we consider are the front and back of a degraded document. The inverse problem consists in estimating both the source images and the mixture matrix, given the observed data. This problem is a well known ill-posed problem, that is, in some cases, the solution neither exists, nor is unique, nor can be stable in presence of noise. With the aim of restoring the well-position of the problem, different techniques are proposed in the literature; in particular many of them that imposed the orthogonality of the results. We present here a new technique that try to find the best factorization of the covariance matrix of the data. The experimental results confirm the goodness of such a technique.

Αίθουσα Σεμιναρίων/Lecture Room, 23 Σεπτεμβρίου/September 2015, 12:00