

A new blind signal separation (BSS) technique is proposed, enabling a deterministic separation of signals into rational functions. Rational functions can take on a wide range of forms, such as the well-known pole-like shape. The approach is a possible alternative for the well-known independent component analysis when the theoretical sources are not independent, such as for frequency spectra, or when only a small number of samples is available. The technique uses a low-rank decomposition on the tensorized version of the observed data matrix. The deterministic tensorization with Löwner matrices is comprehensively analyzed in this paper. Uniqueness properties are investigated, and a connection with the separation into exponential polynomials is made. Finally, the technique is illustrated for fetal electrocardiogram extraction and with an application in the domain of fluorescence spectroscopy, enabling the identification of chemical analytes using only a single excitation-emission matrix.