The Potential of Blind Source Separation Techniques for Multiple Suppression

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Blind Source Separation (BSS) has received much attention in the context of acoustic mixtures. Most algorithms that separate convolutive mixtures exploit the spatial selectivity of an array of microphones. It is natural therefore to put convolutive BSS into the context of multiple suppression. BSS techniques can be formulated as the problems of separating or estimating the waveforms of the original sources from an array of receivers without knowing the characteristics of the transmission channels, i.e. the subsurface. In this work, we assume that the seismic data, refereed to as output, is modeled by as linear convolutive mixture of primaries and multiples, refereed to as sources. We will describe various approaches, methods and techniques to blind and semi-blind source separation, especially principal and independent component analysis. The goal of this work is to investigate the potential of BSS techniques in handling the primaries and multiples separately. The efficiency of the proposed algorithms will be assessed using synthetic models with increasing complexity.