Discrete and Continuous Dynamical Systems - Series B
Volume 19, Issue 4, June 2014, Pages 979-998

High frequency analysis of imaging with noise blending

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Abstract

We consider sensor array imaging for simultaneous noise blended sources. We study a migration imaging functional and we analyze its sensitivity to singular perturbations of the speed of propagation of the medium. We consider two kinds of random sources: randomly delayed pulses and stationary random processes, and three possible kinds of perturbations. Using high frequency analysis we prove the statistical stability (with respect to the realization of the noise blending) of the scheme and obtain quantitative results on the image contrast provided by the imaging functional, which strongly depends on the type of perturbations.

Keywords: Imaging functional, simultaneous sources, noise blending, high-frequency regime, singular perturbations.
Mathematics Subject Classification: Primary: 35R30, 35R60, 35Q86; Secondary: 86A15, 35L05.

Received: October 2012; **Revised:** January 2014; **Available Online:** April 2014.

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