Target Detection and Localization in the Presence of Noise

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We consider problem of combined detection and localization of a point reflector embedded in a medium by sensor array imaging when the array response matrix is obtained in a noisy environment. We consider additive measurement noise and use elements of random matrix theory to construct the detection test. We study also a detection test based on reverse-time migration of the array response matrix that is the most powerful for a given false alarm rate and compare it with a test based on the singular values of the response matrix.