Source Identification and Tracking

NPL Problem

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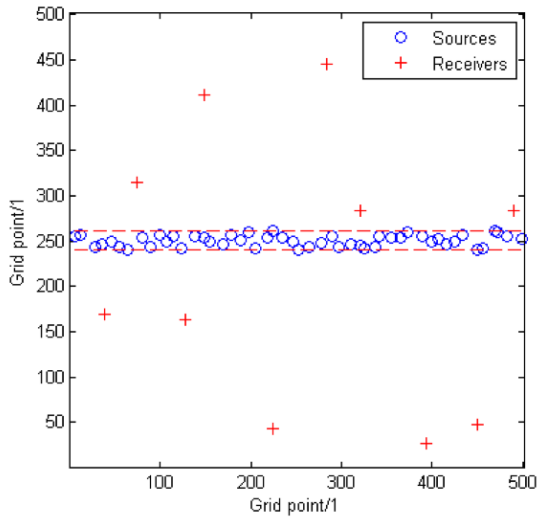

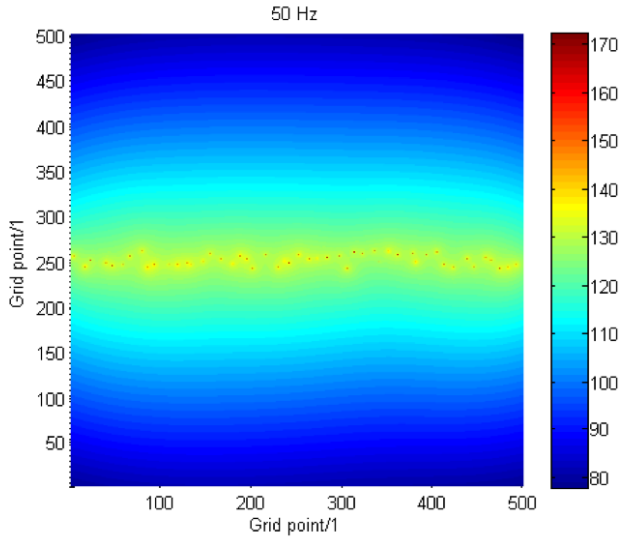

Elastic Net

Use location data as additional penalty term in the LASSO-optimisation

$$\|As - y\|_2^2 + \tau\|s\|_1 + \alpha\|s - s_0\|_2^2$$

where

$$s_0 = \begin{cases} \text{expected noise level of a ship} & \text{known ship location} \\ 0 & \text{otherwise} \end{cases}$$

Questions

- Determine the expected noise level from the data
- Choose optimisation parameters τ and α

Kalman Filtering

State equation:

$$x(k+1) = F(k)x(k) + w(k) \qquad k = 0, 1, ...$$

$v(k)$: process noise with covariance matrix $Q(k)$.
Measurement equation:

$$z(k) = H(k)x(k) + v(k) \qquad k = 0, 1, ...$$

$w(k)$:process noise with covariance matrix $R(k)$.