CSM denoising
Probabilistic Factor Analysis

Décembre 2018

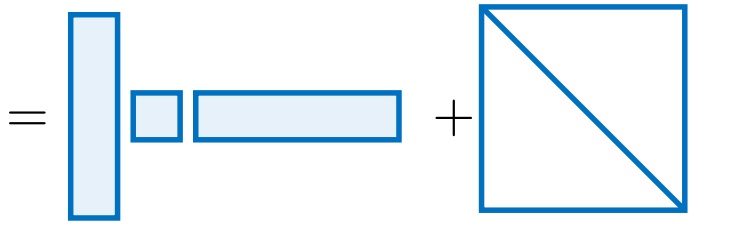
Probabilistic Factor Analysis

- Matrix decomposition using statistical properties:
  - signal CSM : low-rank matrix
  - TBL CSM : diagonal CSM

Statistical model

$$M(\boldsymbol{\theta})$$

$$\boldsymbol{S}_{pp} = \boldsymbol{L}\lceil\boldsymbol{\alpha}\rfloor\boldsymbol{S}_{cc}\lceil\boldsymbol{\alpha}\rfloor\boldsymbol{L}' + \lceil\boldsymbol{\sigma}_n^2\rfloor$$

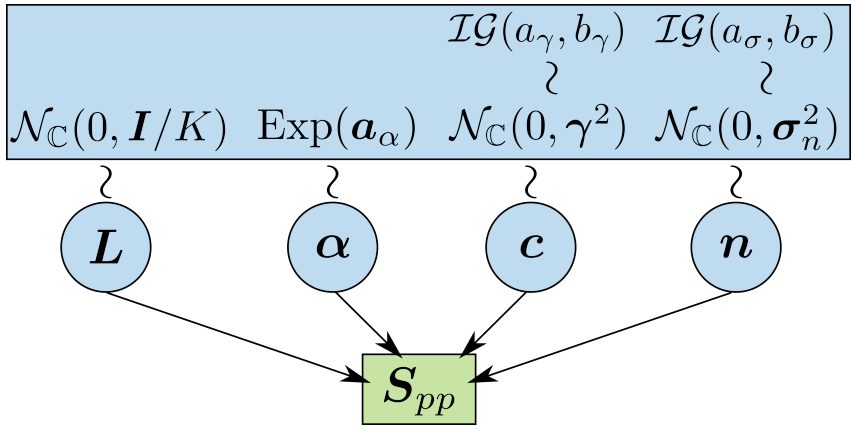


$(M\times K)(K\times K)(K\times M)$ — Low-rank matrix

$(M\times M)$ — Uncorrelated noise

Probabilistic Factor Analysis

Probability distribution for each parameters



Probabilistic Factor Analysis

Optimization process : maximize the posterior distribution

Find the parameter set that best fit the data

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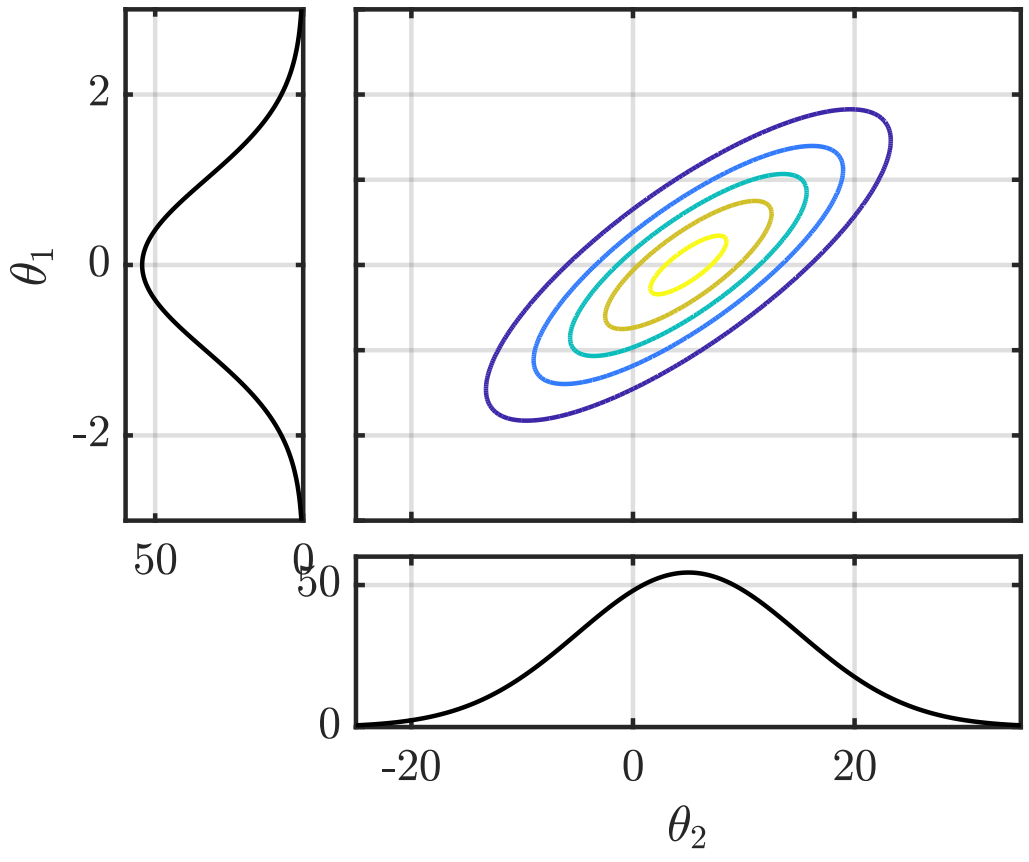

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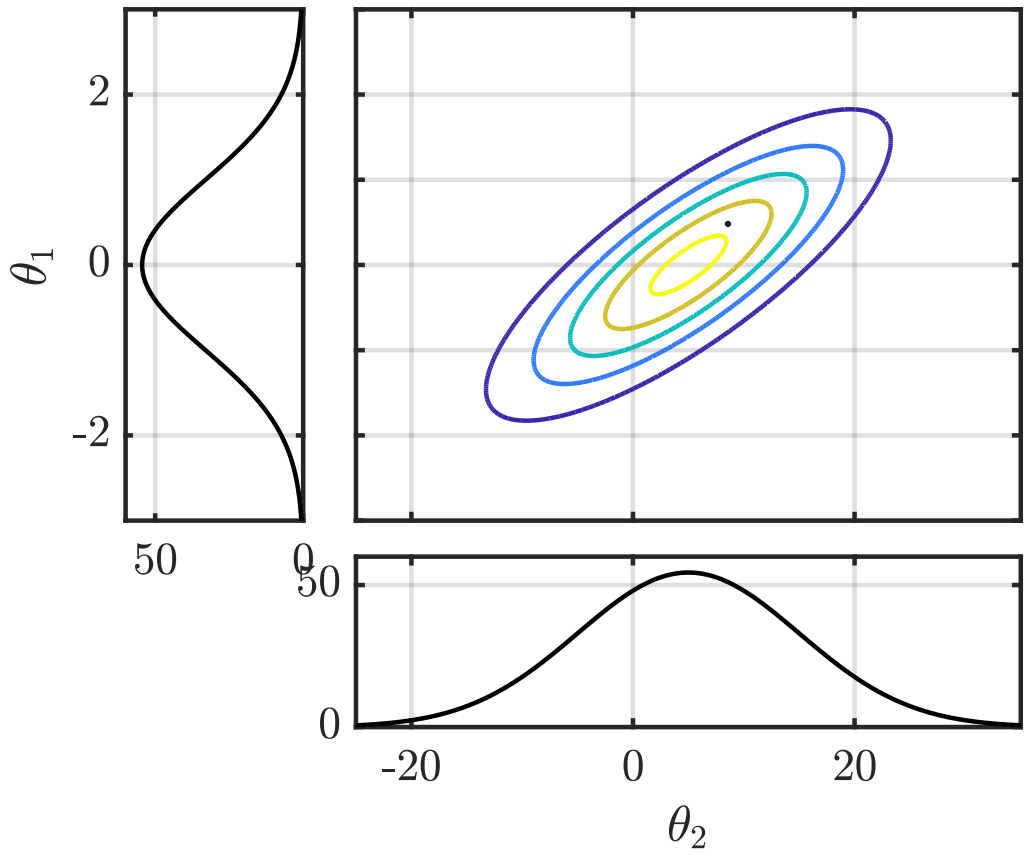

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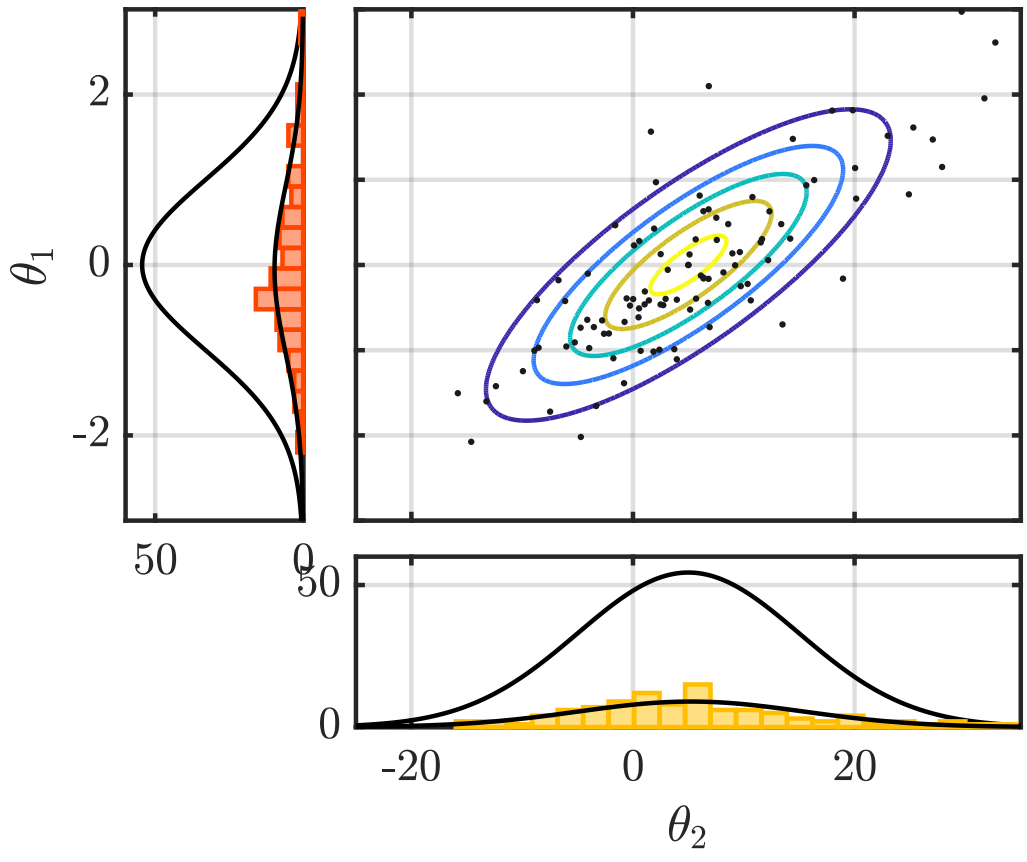

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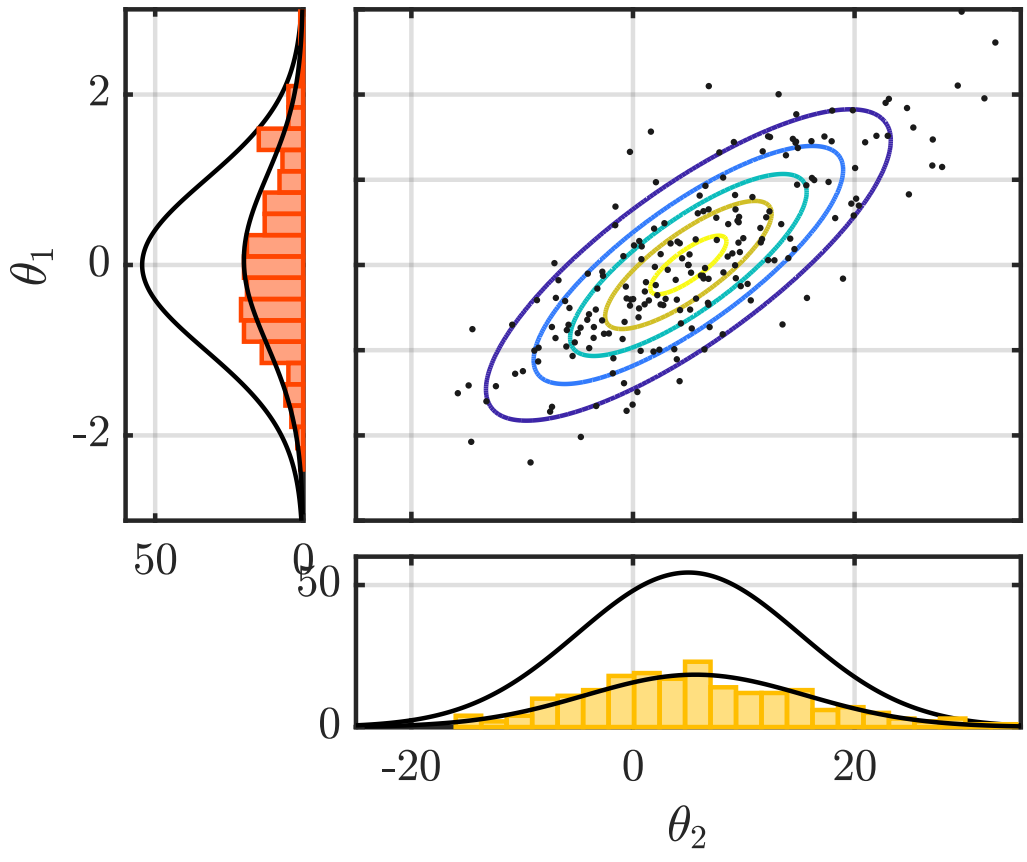

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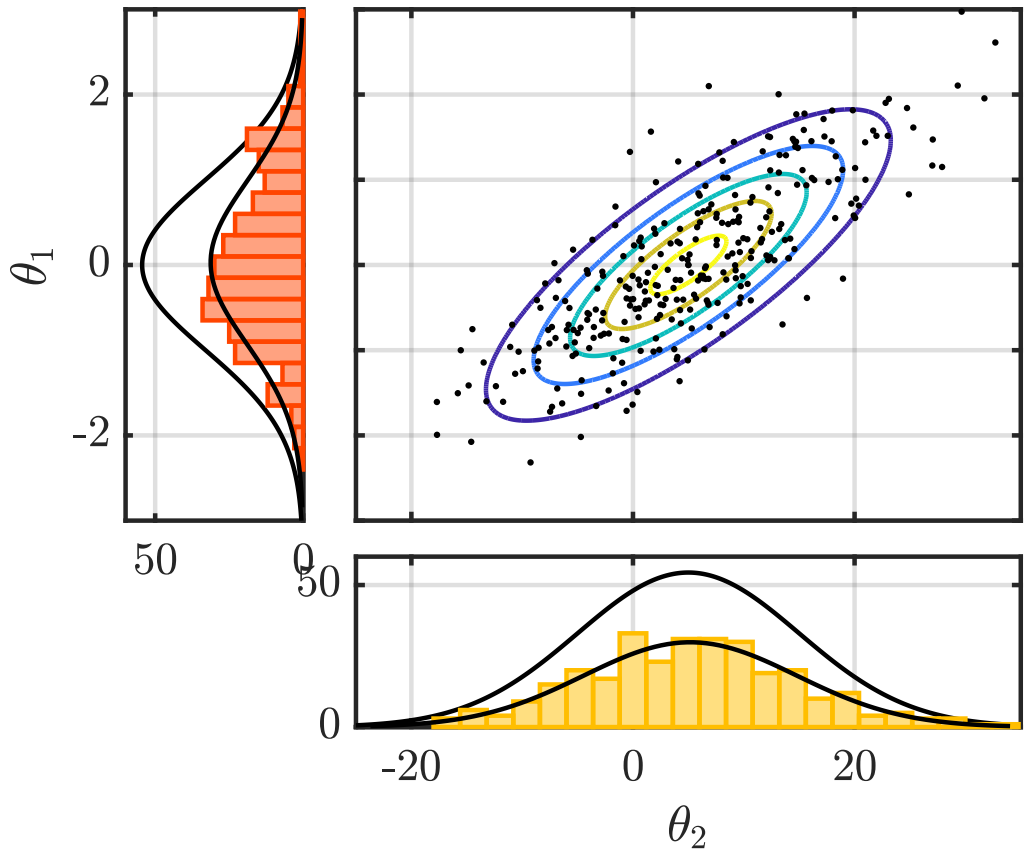

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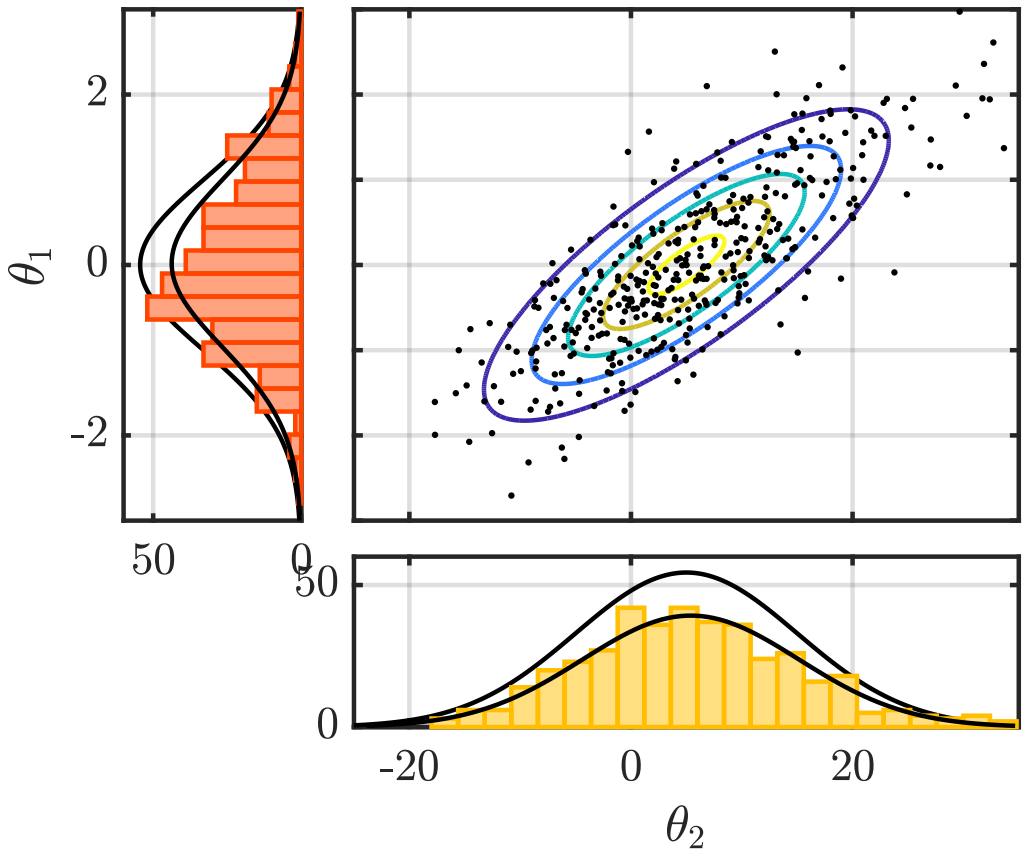

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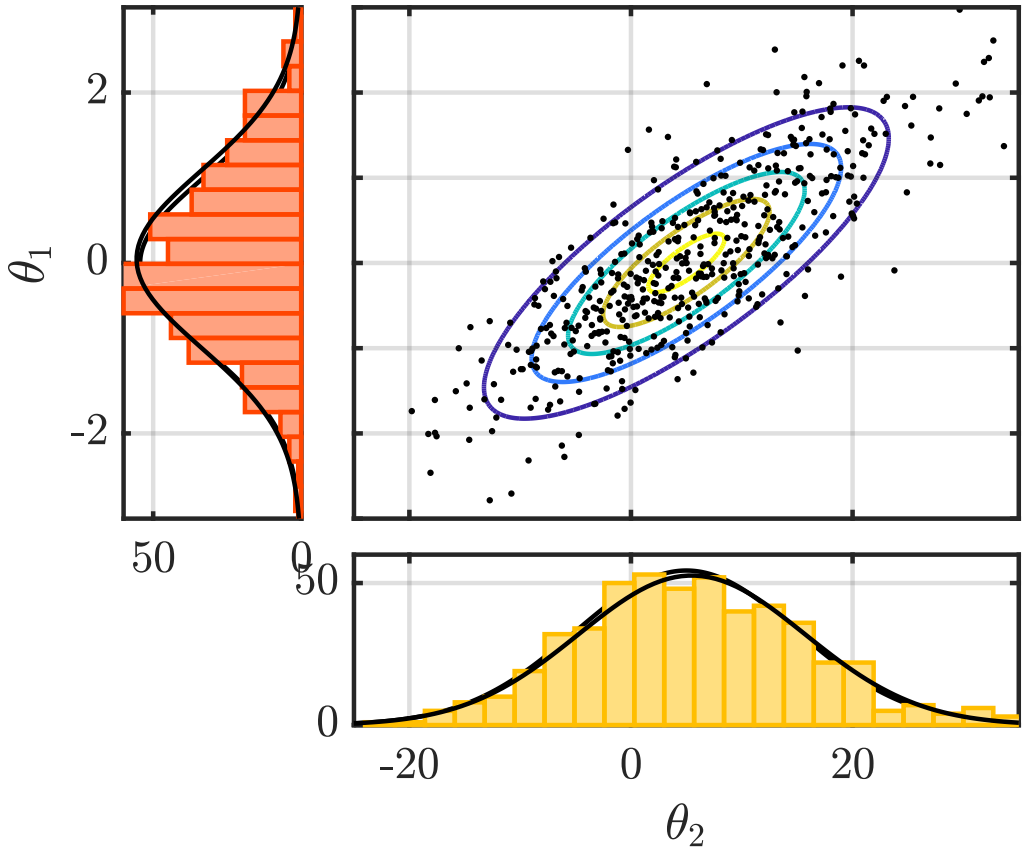

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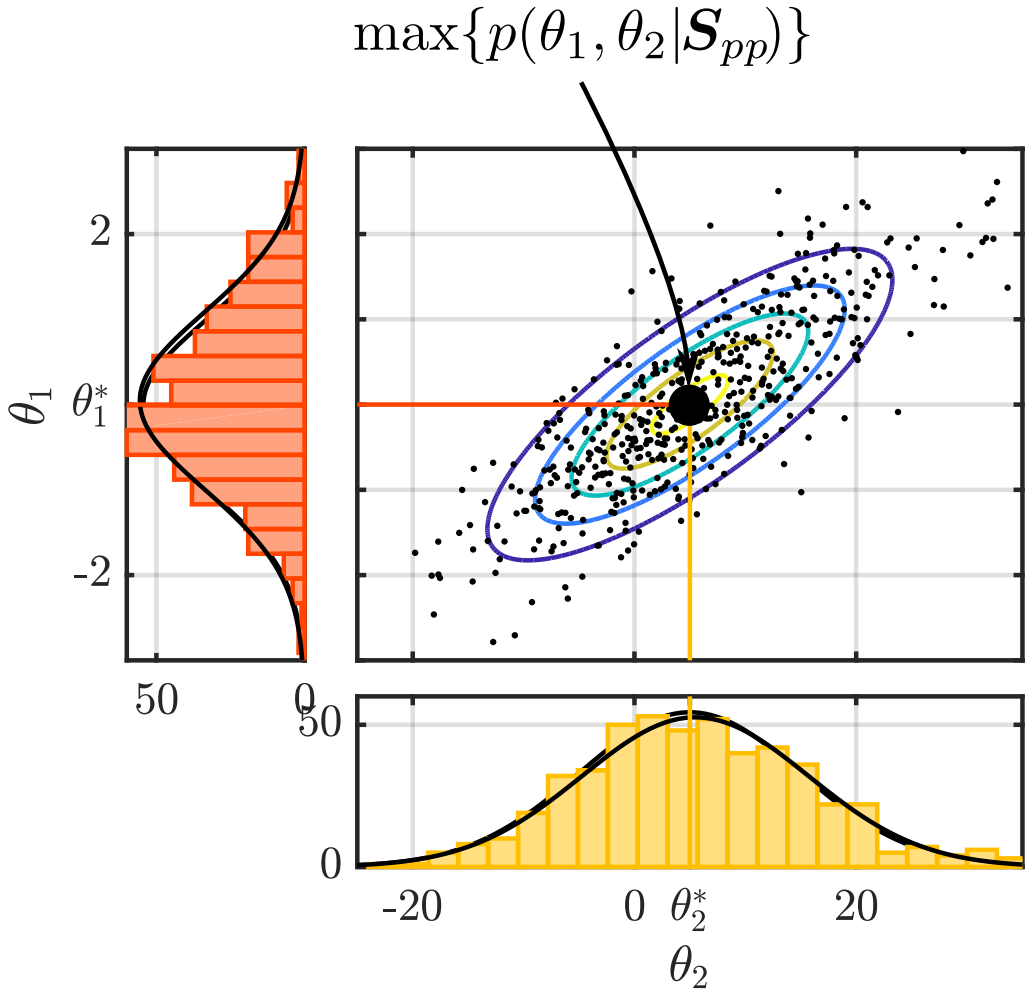

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- Sensitive to prior choices esp. for ill-posed problem
- Computationally expensive