

To-do list

1. Summary of I-priors, what it is, how it's used (regression, classification, variable selection) and how it's estimated. 2

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PhD thesis: ‘Regression modelling using Fisher information covariance kernels (I-priors)’

Chapter 7

Discussion

Wrap-up—what did I do? Summarise contributions. Raise questions.

Summary of I-priors, what it is, how it’s used (regression, classification, variable selection) and how it’s estimated.

The I-prior for the regression model (1.1) subject to (1.2) is seemingly data dependent, which violates Bayesian first principles. That is, an I-prior for f as per (3.7) makes use of the same data $\mathbf{x} := \{x_1, \dots, x_n\}$ in the covariance matrix for f that appears in the model. However, the whole model is implicitly conditional on \mathbf{x} . If the prior depended instead on the responses \mathbf{y} , then the state of knowledge a priori and a posteriori is exactly the same, and this violates Bayesian principles.

7.1 Summary of contributions

- extension of fisher information to infinite-dimensional parameters. the technology for derivatives applicable to other spaces like Banach spaces, could look at RKBS. infinite dimensional vectors e.g. for exponential family type distributions.
- efficient implementation of estimation methods, in particular EM algorithm. iprior package.
- extension of iprior methodology to categorical responses. used variational EM
- BVS. simple hands off approach. works well in multicollinearity.

7.2 Questions

- starting values for EM or direct optimisation. what is the best approach?
- variational approximation. asymptotic distribution of the parameters? any way to get SE from EM? do

7.3 Conclusion