



BISP8

**Eighth Workshop on
BAYESIAN INFERENCE IN STOCHASTIC PROCESSES**

Growth, reproduction and death: an integrated model for fish stocks

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In this work I explore the dynamics of fish populations subject to human harvesting. There are four sets of unknowns in these models:

- 1) fish abundance;
- 2) biological parameters, which describe e.g. natural mortality, fecundity, and the ecosystem's carrying capacity;
- 3) ecological parameters, which define the population's spatial distribution;
- 4) fisheries parameters, which characterise the vulnerability of fish to fishing gears.

In order to estimate all these quantities, I develop a Bayesian, age structured, hierarchical, dynamic linear model, and partition the Markov chain Monte Carlo work load over a cluster of processors. The model is coded in pattern-based, object-oriented Fortran 2003, which permits easy comparison of multiple model configurations. A real data set, comprising tens of thousands of commercial and scientific records, that span over more than two decades, is analysed.

Keywords:

hierarchical Bayesian models; dynamic linear models;
spatio-temporal models; parallel computing.

ABSTRACT

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TYPE

Young researcher Ricardo Lemos invited to contribute