Introduction to AD Model Builder

Thursday 19 September 14:00–17:00
University of Iceland
Room 220, Main Building

ADMB is free and powerful software to fit statistical models, especially nonlinear and/or random-effects models. The software was introduced in 1993, became open source in 2008, and is available for all major operating systems from `http://admb-project.org`.

In this introduction, members of the ADMB development team would like to describe and demonstrate the software to quantitative scientists in Iceland.

The advantages of ADMB, compared to alternative software, include:

1. Very fast and reliable estimation. The optimization uses automatic differentiation to compute analytical derivatives, instead of numerical approximations. Scales well to 1000s of parameters.

2. Completely general language, a thin programming layer on top of C++, not restricted to specific types of models.

3. Uncertainty can be evaluated using the delta method, profile likelihood, or MCMC, using built-in switches.

4. Random-effects vectors can be used to fit generalized linear mixed models (GLMM), state-space time series models, etc.

We will start with a brief introduction, run a variety of existing example models, and encourage discussion. People can bring laptops so we can assist with installing ADMB and run examples of special interest to each participant.

The annual ADMB developer meeting happens to take place in Iceland this year and one objective of the meeting is an outreach to Icelandic potential users. This provides an excellent opportunity to learn the basics of AD Model Builder in an afternoon.

Around 1000 journal papers have cited ADMB, but two recent papers describe the software in some detail:

Fournier et al. (2012) AD Model Builder: Using automatic differentiation for statistical inference of highly parameterized complex nonlinear models. Optimization Methods & Software 27:233–249.

Bolker et al. (2013) Strategies for fitting nonlinear ecological models in R, AD Model Builder, and BUGS. Methods in Ecology and Evolution 4:501–512.