AD Model Builder Introductory Workshop

http://admb-project.org/

Welcome and Introduction



ADMB Foundation

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Workshop Outline

Morning: 9:00 to 13:30; Lunch: 13:30 to 14:30; Afternoon: 14:30 to 17:00.

- 1. Introductions
- 2. Installation
- 3. Why "AD" in AD Model Builder
- 4. First example
- 5. How to specify model parameters
- 6. Likelihood based inference
- 7. Data input and reporting results.
- 8. Random effects
- 9. Estimating uncertainty
- 10. Feedback on course























Introudctions

Instructors

- Anders Nielsen (Technical University of Denmark, DTU-Aqua)
- John Sibert (Pelagic Fisheries Research Program, University of Hawaii)

With a lot of help from

- Johnoel Ancheta (Pelagic Fisheries Research Program, PFRP)
- Mark Maunder (Inter-American Tropical Tuna Commission, IATTC)

Please introduce yourselves

- Name and Organization
- Your research and what you would like to do with ADMB?





















What is ADModel Builder?

- A tool for building models and challenging them with data.
- Enables efficient estimation of model parameters.
- Consists of a template language, similar to a fourth-generation computer language.
- Includes template processor, C++ libraries and utility scripts.





















ADMB Simplifies model development

- Manages description and input of data.
- Manages description of model parameters and objective function.
- Manages the interface between model parameters and numerical function minimizer.
- Includes for describing and estimating model uncertainty.
- Vector and matrix operators.
- C++ implementation allows creation of complex data stuctures and use of specialized libraries.





















Efficient estimation of model parameters

- ADMB Minimizer uses analytically correct partial derivatives of objective function.
- Parameters may be estimated in user-specified order estimation "phases".
- Bounds may be imposed on all parameters.





MCMC algorithm

- Starts at the mode of the posterior distribution to reduce "burn-in" time.
- Jumping rules based on the covariance matrix at the mode of the posterior distribution.
- Enables rapid and accurate Bayesian integration.





Random effects parameters

- Uses Laplace's approximation (and importance sampling).
- Analytically correct second derivatives.
- Adaptable for process error and meta analysis.





















The ADMB Project

- Make ADMB Free
- Make ADMB open source
- Promote further development of ADMB
- Facilitate the use of ADMB
- Promote application of ADMB in many disciplines



















