

AD Model Builder Workshop

Instructed by Jim Ianelli

April 6th - April 9th 2009

NMFS Regional Office, Juneau, Alaska

The workshop is geared towards scientists wishing to enhance their ability to evaluate data using flexible and rigorous statistical methods. AD Model Builder (admb-project.org) provides a highly efficient approach with benefits including: 1) Flexibility. The user is free to define any desired model, and not limited to choose between a set of predefined models. 2) Speed. Automatic differentiation can make the difference between waiting hours and seconds for a converging model fit. 3) Precision. Automatic differentiation calculates the derivatives as accurately as if the analytical derivatives were implemented. 4) Quantification of uncertainties. With almost no extra effort AD Model builder produces several different estimates of the uncertainties of model parameters and selected derived quantities. The course will be divided into two sections: the first section will introduce some more basic concepts and discuss the background computer languages. The second section will focus on more advanced statistical modeling and approaches using AD Model Builder. The class format will include lectures followed by hands-on exercises.

Part 1: Basic Statistical Modeling and Modeling Programs (April 6–7)—general nonlinear models and introduce different statistical modeling programs and languages including:

- An introduction to nonlinear statistical models
- Configuring and installation strategies
- An Introduction to the C and C++ programming languages and ADMB added structures
- Practical problems in fitting nonlinear statistical models.

Part 2: Advanced Modeling with AD Model Builder (April 8–9)—advanced modeling topics specific to the program AD Model Builder, including:

- Managing model complexity by using higher dimensional dynamically defined data structures.
- Automatic differentiation, derivatives and the minimization of functions of many parameters.
- A more complicated model (perhaps catch-at-age fisheries model) to use as an example for more advanced topics.
- Statistical interpretation of the results of the analysis.
- Advance ADMB features (simulation, MCMC, random-effects).
- Debugging ADMB programs.

Where: NMFS Regional Office Building, 709 W. 9th Street, 4th floor
Juneau, Alaska

Instructor: Jim Ianelli, Jim.Ianelli@noaa.gov

Course options and cost:

Part 1 **only** (2 days, April 6–7) OR

Part 2 **only** (2 days, April 8–9) \$300 for AFS members; \$350 non-members

Full workshop (4 days, April 6–9) \$500 for AFS members; \$550 non-members

Payment is due March 23 before 5:00 pm

Only 9 seats are available!! Costs may be reduced based on attendance.

Registration: Please fill out the registration form by **March 26th** and return to: tammyhoem@yahoo.com

AFS will invoice each participant for costs based on the number of students registered.