

Workshop II - AD Model Builder Advanced Fishery Applications June 12-13 2006

This course will cover more advanced topics. Topics will include (1) methods for assessing uncertainty in model results; (2) review of available ADMB/AUTODIFF functions; (3) instruction on writing functions; and (4) tricks involved in model parameterization, including estimating parameters in phases and considerations for alternative approaches.

Workshop II Agenda

Session 1 - June 12 (8:30 AM to 12:00 PM)

Introduction

- Introductions
- Overview of the course
- Using the computer system
 - E-macs menu system
 - E-macs editing

The likelihood profile method in ADMB

The Bayesian Paradigm and MCMC

- Theory
- Pragmatic issues that need to be faced
 - How long should the chain be run?
 - How much of the initial chain should be left out as a “burn-in” period?
 - Should the chain be “thinned”?
- Actually running a chain in ADMB and getting at the results
- Some advantages and disadvantages of the ADMB approach to MCMC
- Diagnostics
 - Trace plots
 - Autocorrelation of chain and effective sample size
 - Examination of subchains
 - Examination of parallel chains
 - Using likelihood profile to get starting values
 - Other diagnostic measures (mainly pointing to the literature)
- Hands on adding of a new variable to summarize and running an MCMC

Session 2 – June 12 (2:00 PM to 5:00 PM)

Improving Efficiency

More advanced use of functions (passing arguments to them)

Using a control program to automate repeat fitting of a model

Testing a model by simulating data

Combining control programs and simulation in a simulation study

Session 3 – June 12 (7:00 PM to 9:00 PM)

Practicum in coding a simple simulation study

Session 4 – June 13 (8:30 AM to 12:00 PM)

Recap and questions about Day 1

Models with random effects and highest posterior density estimation

- A full Bayesian analysis as an alternative
- A frequentist approach to mixed models
- Hands on example with ADMB-RE

Session 5 – June 13 (2:00 PM to 5:00 PM)

Small but important topics and tricks

- Ragged arrays
- Dealing with years with no data
- A review of advanced admb functions
- Building flexibility into models with control through the data file