Choosing the observational likelihood in state-space stock assessment models - DTU Orbit (08/08/2018)

Choosing the observational likelihood in state-space stock assessment models

Data used in stock assessment models result from combinations of biological, ecological, fishery, and sampling processes. Since different types of errors propagate through these processes it can be difficult to identify a particular family of distributions for modelling errors on observations a priori. By implementing several observational likelihoods, modelling both numbers- and proportions-at-age, in an age based state-space stock assessment model, we compare the model fit for each choice of likelihood along with the implications for spawning stock biomass and average fishing mortality. We propose using AIC intervals based on fitting the full observational model for comparing different observational likelihoods. Using data from four stocks, we show that the model fit is improved by modelling the correlation of observations within years. However, the best choice of observational likelihood differs for different stocks, and the choice is important for the short-term conclusions drawn from the assessment model; in particular, the choice can influence total allowable catch advise based on reference points.

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