**FISH 559: Example Application II (Fitting predation functions)**

One of the components of the move to Ecosystem Based Fishery Management is the use of multispecies models for assessments purposes. The results of these types of models depend on the assumed functional form which relates predation rate to the density of prey and predators. However, there are many potential functional forms (Koen-Alonso and Yodzis 2005; Canadian Journal of Fisheries and Aquatic Sciences 62: 1490-1512; Kinzey and Punt, 2009: Natural Resource Modelling 22(1): 67-104).

  (1)

where  is the number of consumers (predators),  is the number of prey, and , , and  are parameters.

The file EX2.DAT lists data for a consumer and four prey species. Write a single ADMB program which:

* Reads the basic data from EX2.DAT
* Can be used to fit any of the four models (hint: set the phases for the parameters based on an input read in during the data section from a file EX2.CTL). Read in a model type which determines which model is to applied and use that to select which parameters should be estimated.
* There should be separate values for each parameter for each species and the data for all three species should be fitted simultaneously.
* Use a PIN file to set the initial values for the parameters and impose bounds on the values for the parameters.
* Outputs the model predictions over a range of prey numbers for consumer numbers of 0.5, 1 and 2.