**Example Application I (Fitting growth curves)**

Two commonly applied curves relating length to age are the logistic function (Eqn 1a) and the von Bertalanffy curve (Eqn 1b)[[1]](#footnote-1):

 (1a)

 (1b)

where  is the asymptotic size,  is the age at which length is half of ,  is the difference between age at which length is 95% of  and ,  is the growth rate parameter, and  is the age corresponding to zero length. You can assume that the errors measuring length-at-age are normally distributed with mean 0 and standard deviation .

Given the data file EX1.DAT:

* fit models 1a and 1b using TMB;
* print out the model predictions for ages 0-20 ;
* write an R function to plot the data and the two sets of model predictions;
* use AIC to (a) select a best model and (b) compute AIC-weights; and
* find a model-averaged estimate for .

Hints:

* Write down the negative log-likelihood function first
* To keep parameters positive, estimate them in log-space
* You should have one CPP file and use the *map* option to ensure that you only estimate the correct number of parameters.

1. Both of these curves are special cases of Schnute’s (1981) generalize growth model. [↑](#footnote-ref-1)