**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)