Abstract

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Fisheries scientists are often interested in obtaining weights of fish for use in any number of studies. In order to weigh a fish in the field and return it unharmed to the water, the procedure needs to be done rapidly and with acceptable precision. Compared to weight, length of fish is relatively easy to measure with good precision in the field. Thus, fisheries scientists have long relied on a strong relation between weight and length to allow length to be recorded, and then weight obtained from a known length-weight key at a later time. Also, the relationship between weight and length in many fish species helps to understand something about the manner in which fish accumulate weight relative to their morphological characteristics. In this study, we aim at developing a model that adequately represents the relation between length and weight. A traditional way is to construct linear relation between log weight and log length. Our first model is such linear model under a hierarchical Bayesian structure. Then we further tried a non-linear model in which hierarchical Bayesian structure is also used. The difference between these two models is in the error structure. The computation for the non-linear model involves Random Walk Metropolis-Hastings. In order to answer the question: "Is it proper to take a shortcut (use linear model) here?", we use Kolmogorov-Smirnov Statistics as a way to evaluate our models by measuring discrepancy between real data set and model fitted data set.