



Analysis of Survival Data Using Hypertabastic Models

Mohammad A. Tabatabai
Meharry Medical College, Nashville, TN 37208, USA
mtabatabai@mmc.edu

Sejong Bae
University of Alabama Birmingham, Birmingham, AL 35294, USA
bsejong@uab.edu

Karan P. Singh*
University of Alabama Birmingham, Birmingham, AL 35294, USA
kpsingh@uab.edu

Bone under repetitive stress can lead to 'stress' fractures. Stress fractures in elderly people are an important issue due to the growing number of elderly in society and their activeness in that age. Fatigue tests on 23 female bone samples from three individuals were analysed. Hypertabastic survival models are a parametric method for survival analysis and life testing. A hypertabastic survival probability function of the normalized stress level and age was developed using a previously published bone fatigue stress data (Cotton, et al., J Biomechanics 2003). The AIC measure was used to compare the fitness of hypertabastic, Weibull, and log-logistic models. Based on this measure for model selection, hypertabastic models were selected. A hypertabastic hazard function of normalized stress level and age was also derived. Furthermore, hypertabastic proportional hazard models were used to analyse the tensile fatigue and cycle-to-fatigue of cortical bone.

Keywords: Hypertabastic models; Probability function; Cortical bone; AIC measure.