PDEMR Modelling of Protea Species in the Population Size of 1 to 10, in Cape Floristic Region from 1992 to 2002, South Africa

Danni Guo[1], Renkuan Guo[2], Guy F. Midgley[1], Rebelo A. G. [1]

[1]Kirstenbosch Research Center, South African National Biodiversity Institute, Private Bag X7,
Claremont 7735, Cape Town, South Africa
[2]Department of Statistical Sciences, University of Cape Town, Private Bag, Rondebosch 7701, Cape Town, South Africa

Abstract
Global warming and climate changes can lead to the movement of plant species as they find their original habitats are no longer suitable to their needs. It is often an urgent task to establish a mathematical model to catch up the trajectories of the endangered species to effectively manage environmental protection under the inevitable biodiversity changes taking place. However, as it often happens with the environmental data, within the study area, some areas are well sampled, while other areas are not sampled. Even the collected data are often just species presence or categorical data. This makes very difficult to a spatial analysis, and impossible to do a kriging prediction map. In this paper, we use the *partial differential equation motivated regression* (PDEMR) model, to model Protea species in the population size of 1 to 10, in the Cape Floristic Region, from 1992 to 2002, in South Africa.

Keywords
Partial Differential Equation Motivated Regression (PDEMR), mathematical model, Protea, endangered species, global warming, climate changes, Cape Floristic Region