Supplementary Material

Estimation of Global Irradiation Parameters at Location of Migratory Birds in Iğdir, Turkey by Means of MARS Algorithm

Gokhan Sahin[1], Ecevit Eyduran[2,*], Mete Turkoglu[3] and Fatma Sahin[2]

[1]*Department of Electric Electronic Engineering, Engineering Faculty, Iğdır University, Iğdır, Turkey*
[2]*Biometry Genetics Unit, Department of Animal Science, Agricultural Faculty, Iğdır University, Iğdır, Turkey*
[3]*General Directorate of Nature Protection and National Parks, Republic of Turkey Ministry of Forestry and Water Affairs, Iğdır, Turkey*

Supplementary Material

Codes of multiple responses of MARS data mining algorithm.

```
> d=read.table("C:/gokhan.txt", header=T)
> str(d) # determination of variable structures
> install.packages("earth") # the installation of the earth package on MARS algorithm
>library(earth) # the activation of statistical analysis of the MARS data mining algorithm
> # simultaneous analysis of multiple continuous response variables
>marsmodel=earth(cbind(Hd, Hm)~., data=d, penalty=2, pmethod= "backward", nfold=3, nk=120, degree=2, keepxy=T)
> summary(marsmodel) # MARS results for multiple continuous responses
>summary(marsmodel, digits=3) # MARS results with 3 digits for multiple continuous responses
>plot(marsmodel, nresponse=1) # graphics of model selection cumulative distribution of absolute residuals scatter plot of residuals fitted values and residual qq plot for only Hd response variable
> plot(marsmodel, nresponse=2) # graphics of model selection, cumulative distribution of absolute residuals scatter plot of residuals fitted values and residual qq plot for only Hm response variable
>plotmo(marsmodel, nresponse=1) # changing graphics of only Hd response variable according to the influential predictors
>plotmo(marsmodel, nresponse=2) # changing graphics of only Hm response variable according to the influential predictors
> install.packages("pastecs") # the installation of the pastecs package on descriptive statistics
> library(pastecs) # the activation of the package of the relevant descriptive statistics
>stat.desc(d$Hd) # The estimation of descriptive statistics for Hd response variable
>stat.desc(d$Hm) # The estimation of descriptive statistics for Hm response variable
># the calculation of standard ratio goodness of fit criterion for Hd and Hm response variables
>stat.desc(marsmodel$residuals) # the descriptive statistics of residuals estimated by MARS for Hd and Hm response variables
># the standard deviation ratio is the ratio of standard deviation of the observed Hd to standard deviation of the residuals of Hd
># the standard deviation ratio is the ratio of standard deviation of the observed Hm to standard deviation of the residuals of Hm
```