

## MTH443: Quiz 2

Full Marks 20

Time: 17:10-18:00

**Put your code, output/plot/answer/interpretation of the output in a single file and upload the pdf file through the Exam (Quiz 2) link on mookIT.**

- [1] Consider the dataset `currency_crisis.csv` having the following economic fundamental variables as dimensions of a feature vector: (a) Foreign Exchange Reserves; (b) Foreign Assets - Foreign Liabilities (USD) as % of Forex; (c) Import; (d) import-export as % of previous years forex; (e) Money Multiplier of broad Money; (f) Broad Money/Gross International Reserve; (g) Real rates on deposits, (h) real interest rate differential; (i) lending rate/ deposit rate; (j) Time deposits; (k) Demand Deposits; (l) IIP; (m) Deviation from REER; (n) FDI; (o) Crude oil prices USD/Barrel. The last column of the dataset is a class variable having two possible values “0” and “1”. “1” indicates a currency crisis point within next 12 months and “0” indicates no crisis point within next 12 months.
- Split the available data into 2 parts, keeping every 10<sup>th</sup> record in out of sample test data set and apply the following classifiers to build classification models for the above 2-class problem: (i) quadratic discriminant function, (ii) logistic classifier, (iii)  $k$  nearest neighbour (with  $k = 5$ ).
- Report the confusion matrices, separately, for training set and test set data and the corresponding misclassification error rates, of the classification for all the models.
- [2] The dataset “`faithful.csv`” contains data on eruption duration and the waiting time in between eruptions of the *Old Faithful Geyser*. (i) Obtain kernel density estimate using a Gaussian kernel function to the variable “eruption” and obtain the plot of estimated density over the data histogram; (ii) Fit a bivariate mixture Gaussian density using EM algorithm to the dataset and obtain a plot the fitted bivariate density.

**Note:** A maximum of 17 mins compensatory time to 231080042, 231080053, as per Gol rules