**README OF MULTIPLE POLYNOMIAL EQUATION SYSTEM DATABASES THAT WERE GENERATED**

made by: César Miranda Meza

email: cmirandameza3@hotmail.com

The multiple polynomial classification equation that was used as a reference to create the databases labeled as “the multiple polynomial classification equation systems” is the following:

Where is the dependent variable (output of the current sample); represents the independent variables (inputs of the current sample); and stand for the coefficient values of the equation. Furthermore, the values that were selected for are the following:

such that the Eq. will turn into the following:

However, the Eq. was modified by adding to it a bias component , that would represent a random value and should be generated each time a new sample is calculated:

Where the independent variable was restricted to be sampled with values according to the following way and where if no random bias value is needed, then it should be negated by setting or, Ec. (2) should be used instead.

Nevertheless, several regression databases governed by the term from the Eq. have already been created (see databases in the directory databases/regression/randMultiplePolynomialEquationSystem). Therefore, it was decided to recycle them and use a copy of those files in Excel to apply to them the threshold defined in the Eq. , which is . As a consequence, the following .csv (comma delimited) files were generated for the creation of the multiple linear classification equation systems:

* randPolynomialEquationSystem/1systems\_10samplesPerSys.csv
* randPolynomialEquationSystem/10systems\_10samplesPerSys.csv
* randPolynomialEquationSystem/10systems\_100samplesPerSys.csv
* randPolynomialEquationSystem/100systems\_100samplesPerSys.csv
* randPolynomialEquationSystem/100systems\_1000samplesPerSys.csv
* randPolynomialEquationSystem/1000systems\_1000samplesPerSys.csv

And for the ones made from the Eq. (2), which were created with the same strategy (see databases in the directory databases/regression/multiplePolynomialEquationSystem), the following .csv (comma delimited) files were generated:

* polynomialEquationSystem/1systems\_10samplesPerSys.csv
* polynomialEquationSystem/10systems\_10samplesPerSys.csv
* polynomialEquationSystem/10systems\_100samplesPerSys.csv
* polynomialEquationSystem/100systems\_100samplesPerSys.csv
* polynomialEquationSystem/100systems\_1000samplesPerSys.csv
* polynomialEquationSystem/1000systems\_1000samplesPerSys.csv

For all these .csv files, note that they try to mimic how a real database would normally be organized by a professional and in which you will encounter four columns, whose headers and purpose are the following:

1. **id:** Represents the unique identifier for the current row of the database.
2. **system\_id:** Represents the unique identifier for the current system sampled. This is because the databases will contemplate having several samples for several systems that manifest the same phenomenon.
3. **dependent\_variable:** Represents the output value of the current sample.
4. **independent\_variable\_1:** Represents the input value 1 that generated the current sample.
5. **independent\_variable\_2:** Represents the input value 2 that generated the current sample.

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