EE393 – PYTHON FOR ENGINEERS SEMESTER PROJECT REPORT

ECONOMIC DISPATCHER

How to use this program

This program needs to take some inputs from the user. These inputs are : The coefficients of the 3 generators and total demand. After entering these values user can click the «OK» button in order to get the result

Purpose of this program

The purpose of this program is determining the output power genereted by 3 different generators to supply the specified demand in a way that will minimize the total cost of fuel. Each generators has a unique production costs defined by its fuel coefficients. This process is called Economic Dispatch. Economic dispatch is defined as the coordination of the production costs of all the participating units in supplying the total load. The purpose of economic dispatch is to determine the optimal power generation of the units participating in supplying the load. The sum of the total power generation should equal to the load demand at the station.

Economic Dispatch models the electric power system and dispatches the available generation resources to supply a given load for each control area in the most economic way in real-time operation. The objective is to minimize the total generation cost by meeting the system load demand and Lower and Upper power limits of each generator.

Method of this program

This program is using an algorithm for determining the most economic values. The input coefficients and total demand are implemented to a matrix. To find the most economic dispatch this program uses the Lagrange method. First it defines a Lagrangian function which is a function of power supplies and lambda. Then it takes the derivatives and set these equal to zero for minimization purpose. After this step power supplies become functions of lambda. Our program need a perfect lambda such that total power supply is equal to demand. Lamba will be incremental cost. After setting the coefficients to the numpy linear algebra solver we can get the most economic dispatch by these values

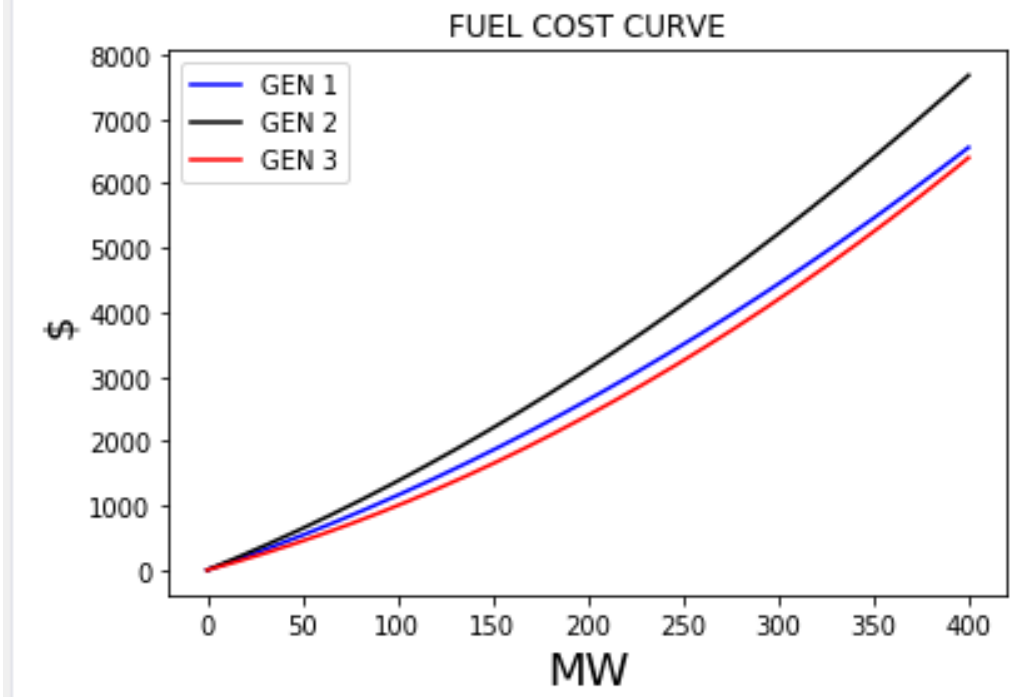
Sample Program

3 GENERATOR SYSTEM

Enter the total demand of the system in MW :	400
Enter the 2nd term coefficient of Generator 1:	0.016
Enter the 2nd term coefficient of Generator 2:	0.018
Enter the 2nd term coefficient of Generator 3:	0.02
Enter the 1st term coefficient of Generator 1:	10
Enter the 1st term coefficient of Generator 2:	12
Enter the 1st term coefficient of Generator 3:	8

OK

The power generated by Generator 1 is 150.83 MW.
The power generated by Generator 2 is 78.51MW.
The power generated by Generator 3 is 170.66MW.
The incremental cost is 14.83$/MWh.
Cost of 150.83MW from Generator 1 is : 1872.24$
Cost of 78.51MW from Generator 2 is : 1053.10$
Cost of 170.66MW from Generator 3 is : 1947.79$



Prepared by : Eytan DİLMEN
Salih Emre KAYNAR