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% ENGR 132
% Program Description
% This program manipulates the data of ambient temperatures and the
% corresponding power output of a power plant. Using this data a
% regression line will be plotted along with a scatter graph with
% proper commands.
% Assigment Information
%   Assignment:     PS 04, Problem 2
%   Author:         Tomoki Koike, koike@purdue.edu
%   Team ID:        002-08
%   Contributor:    no contributor
%   My contributor(s) helped me:
%     [ ] understand the assignment expectations without
%         telling me how they will approach it.
%     [ ] understand different ways to think about a solution
%         without helping me plan my solution.
%     [ ] think through the meaning of a specific error or
%         bug present in my code without looking at my code.
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

INITIALIZATION

```
% Importing the data
plantData = csvread("Data_power_measurements.csv", 1,0);

% Setting each column as a column vector
temp = plantData(:,1);      %The column vector for the temperatures
output = plantData(:,2);    %The column vectors for the power outputs
```

CALCULATIONS

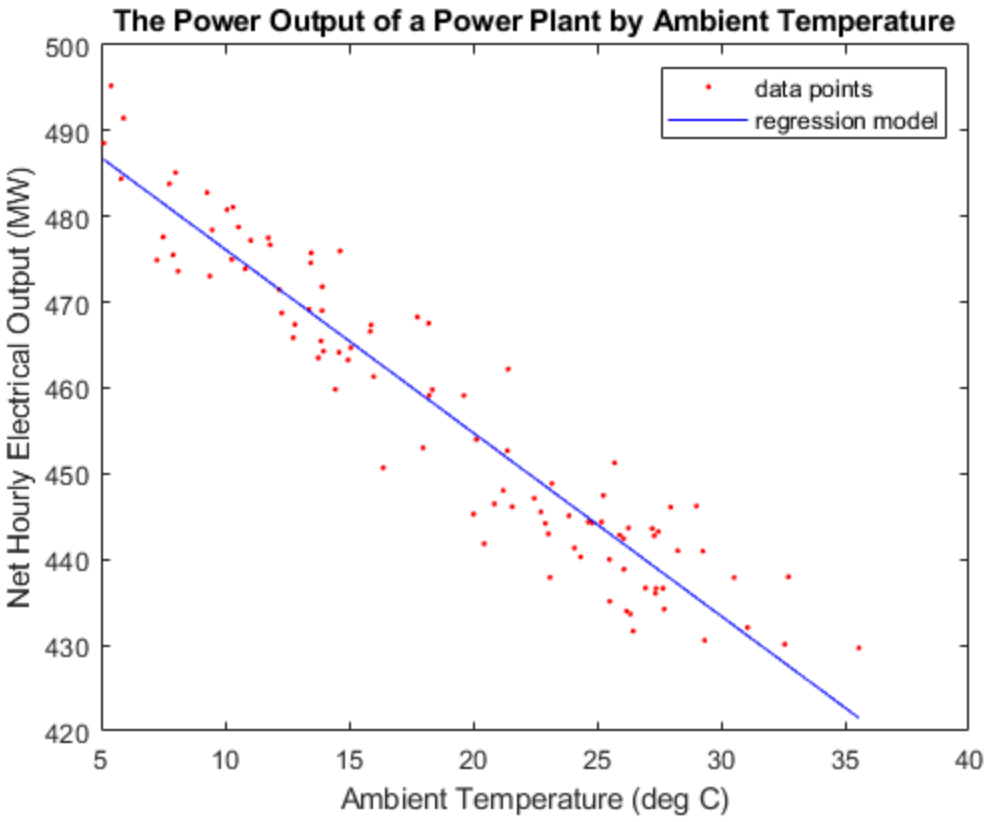
```
% Calcualting the predicted values of regression line
PolyF = polyfit(temp,output,1);
                % This calculates the least square polynominal of
                % the given data set
PolyV = polyval(PolyF,temp);
                % This returns the values of the polynominals
                % evaluated at s-value, temp
outputAvg = mean(output);
                % Calculates the average value of the power outputs
SSE = sum((output - PolyV) .^2);
                % Caluculating the sum of squares due to error for
                % the data
SST = sum((output - mean(output)) .^2);
                % Calculating the sum of squares for the data set
rSquare = 1 - SSE/SST;
                % This calculates the coefficient of determination
```

FORMATTED TEXT & FIGURE DISPLAYS

```
% Printing the results of the SSE, SST, and r^2 on the command window
fprintf("The SSE of the regression line of the data is %.4f\n", SSE);
fprintf("The SST of the regression line of the data is %.4f\n", SST);
fprintf("The r^2 of the regression line of the data is %.4f",
 rSquare);


% Plotting the scatter graph and the regression line
plot(temp,output,".r")
xlabel("Ambient Temperature (deg C)")
ylabel("Net Hourly Electrical Output (MW)")
title("The Power Output of a Power Plant by Ambient Temperature")
hold on
plot(temp,PolyV,"-b")
legend('data points','regression model',"location","northeast")
hold off
```

```
The SSE of the regression line of the data is 2759.7471
The SST of the regression line of the data is 28471.6403
The r^2 of the regression line of the data is 0.9031
```



ANALYSIS

-- Q1

The least square models of the excel and the matlab are almost identical; however are 0.001% different which is trivial. Ultimately, the coefficient of determination are both 0.903.

ACADEMIC INTEGRITY STATEMENT

I have not used source code obtained from any other unauthorized source, either modified or unmodified. Neither have I provided access to my code to another. The script I am submitting is my own original work.

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