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```matlab
function [SSE,SST,r2,m,b] = M4Regr_014_05(tau)

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%
% ENGR 132 Program Description
% This function graps all 100 time histories of different thermocouple
 models
% by their price vs tau value. Then creates a regression line modling
 the price
% versus tau value.
%
% Function Call
%   [SSE,SST,r2,m,b] = M4Regr_014_05(tau)
%
% Input Arguments
% 1. tau -  this is a 5x20 matrix of all time history tau values
%
% Output Arguments
% 1. SSE: sum of squares of error for regression line
% 2. SST: SST for the regression line
% 3. r2: r^2 value for the regression line
%   4. m: slop of best fit line
%   5. b: b of best fit line
%
% Assignment Information
% Assignment:        Final Project
%   Team ID:          014-05
%   Team Members:     Alex Pieprzycki, apieprzy@purdue.edu
%                     Colin Jamison, cjamison@purdue.edu
%                     Peter Swales, pswales@purdue.edu
%      Micah Huffman, mhuffma11@purdue.edu
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%
```

INITIALIZATION ---

```matlab
%Written by Micah Huffman
price1 = ones(1,20) * 15.77; %Creates a 1,20 matrixs of all the
 respective prices
```

```
price2 = ones(1,20) * 10.61;
price3 = ones(1,20) * 2.69;
price4 = ones(1,20) * 1.23;
price5 = ones(1,20) * 0.11;
```

CALCULATIONS ---

```
%Written by Micah Huffman
price = [price1 price2 price3 price4 price5];  %Concatenates price
 vectors
tauNew = [tau(1,:) tau(2,:) tau(3,:) tau(4,:) tau(5,:)]; %Concatenates
 matrix of taus

%Creates a regression of linearized data
pricelog = log10(price);
tauCoeffs = polyfit(tauNew,pricelog,1);
m = 10^tauCoeffs(1);
b = 10^tauCoeffs(2);
tauPlot = [0:.01:2];
polytau = b * m .^ tauPlot;


%Written by Colin Jamison
%Computes the r^2 of the line
coeffs = polyfit(pricelog, tauNew, 1);
regressTau = polyval(coeffs,pricelog);
SSE = sum((tauNew - regressTau).^2);
SST = sum((tauNew - mean(regressTau)).^2);
r2 = 1 - SSE / SST;
```

FORMATTED TEXT & FIGURE DISPLAYS ---

```
%Written by Colin Jamison
figure(1)
plot(tau(1,:),price1,'b*',tau(2,:),price2,'r^',tau(3,:),price3,'kd',tau(4,:),price
ylabel('price (dollars)');
xlabel('tau (sec)');
title('Price vs Tau for 5 Thermocouple Designs');
grid on;
hold on;
plot(tauPlot,polytau,'g-');
text(1.25,20,'Price = 32.918 * 0.051066^t^a^u');
text(1.25,15,'Price = .0510*tau + 32.918');
legend('FOS1','FOS2','FOS3','FOS4','FOS5','Best Fit
 Curve','Location','northeast');%CHANGE LINE EQUATION TO BE IN RIGHT
 FORMAT
```

Price vs Tau for 5 Thermocouple Designs

$$Price = 32.918 * 0.051066^{tau}$$

$$Price = .0510*tau + 32.918$$
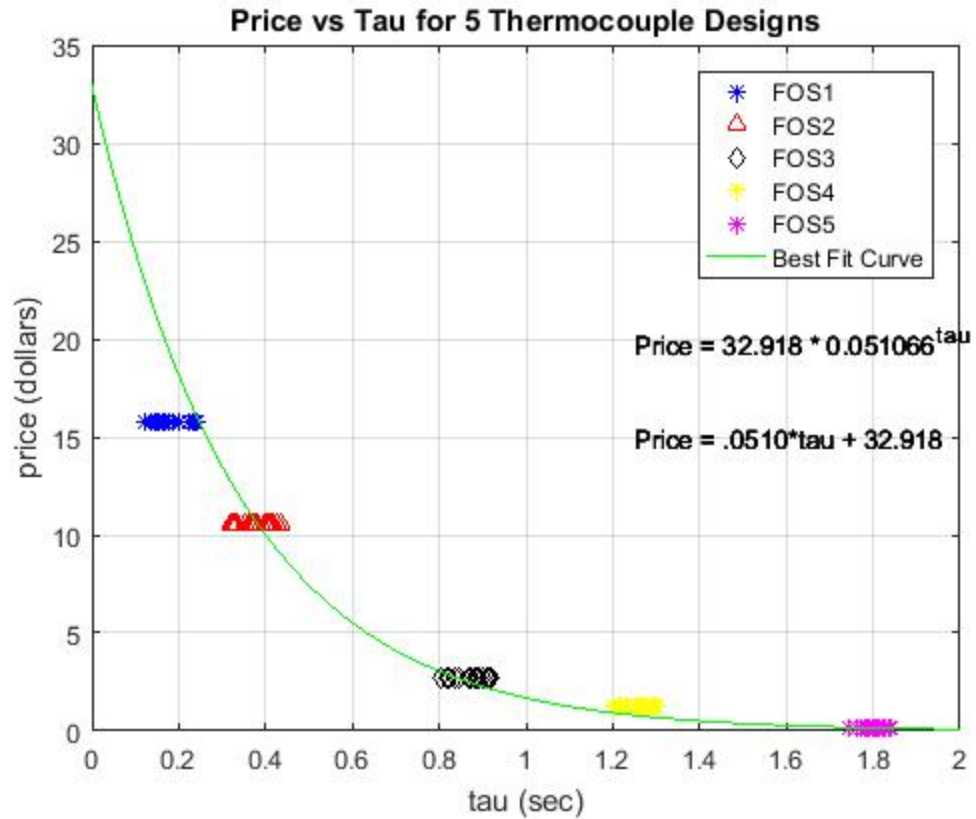
ACADEMIC INTEGRITY STATEMENT ---

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

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