

Pratik Gandhi, Steven MacDonald
 GK-12: AP Statistics at Lawrence High School

Summary:

Students were having difficulty understanding different terms such as linear regression, residual, correlation coefficient etc. So the MATLAB demo was made to cover this topic. Students had freedom to choose mean of X, mean of Y, std of X, std of Y and correlation coefficient. Once they input those parameters, they can see how the data points are distributed. So I asked students to come and play around with these parameters, and explain the results. They also had option to calculate the regression line based on the data provided, and compare it with the actual answer, which can be generated in MATLAB. Nick also found a link, where there are many statics demos made in Java, <http://www.math.csusb.edu/faculty/stanton/m262/index.html>. Mr. MacDonald showed it whole class. Then I showed them my current research and how am I using the correlation coefficients to detect the signal. I also showed them a video about cognitive radio, <http://www.youtube.com/watch?v=E3W43pyEgSk>, and explained them what it is and how can it revolutionize the communication industries.

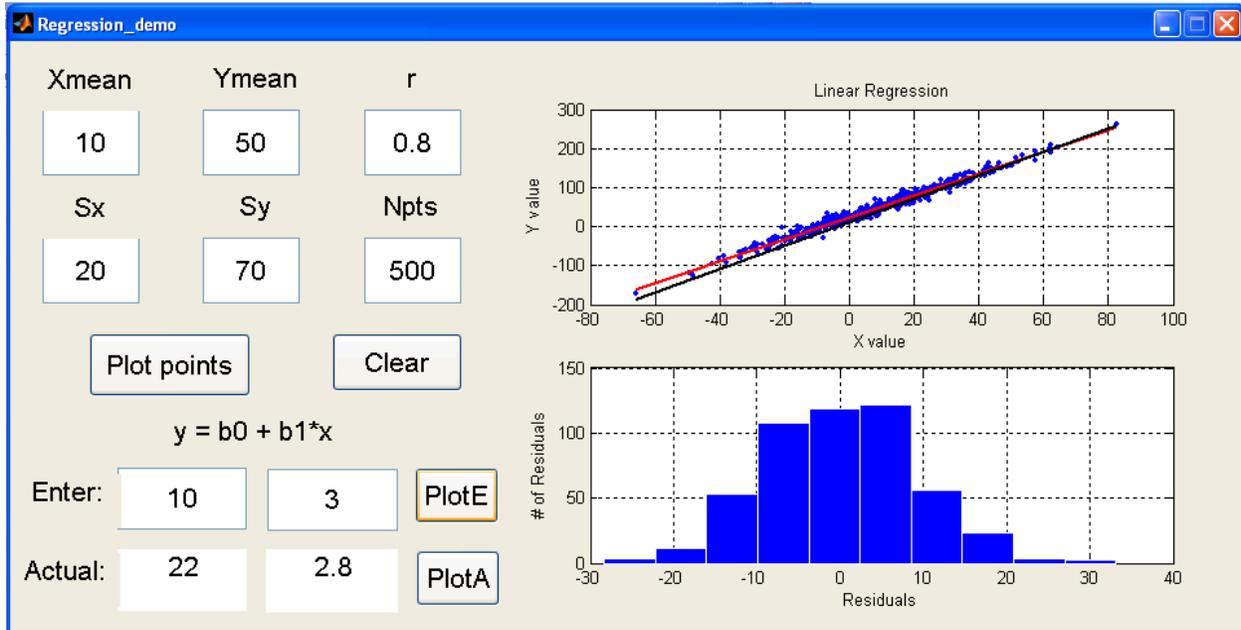
Period: **Class: Correlation**

Date(s): October 17, 2011

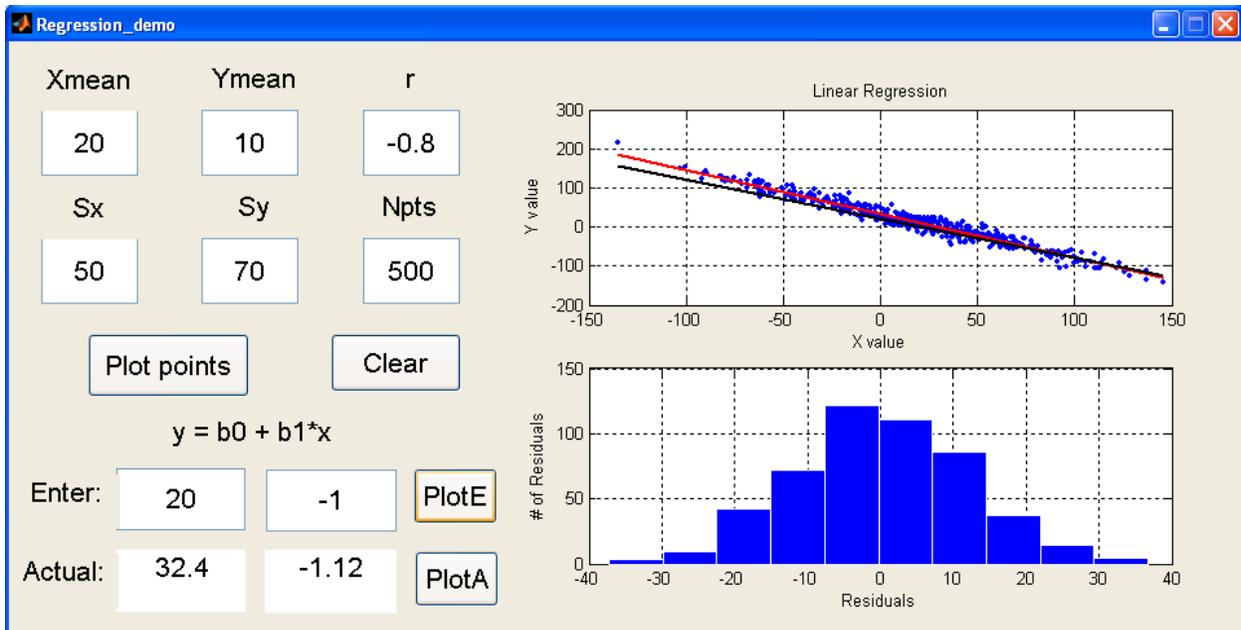
SETTING THE STAGE	
<u>Essential Question</u>	What makes millions of people around the world to talk to each other on cell phones
<u>Content Objective(s)</u> (Student-friendly)	We should be able to understand correlation between two set of values.
<u>Connection to previous or future lessons</u>	Can lead to weather project as well as signal detection.
<u>Critical Thinking Questions</u>	What is correlation? How can it be used to find the relationship between two variables?
<u>Key Vocabulary</u>	Correlation, linear regression, residual
<u>Materials Needed/Safety</u>	Computers, MATLAB

ACTIVE INSTRUCTION	
<ul style="list-style-type: none"> • Launch (Engage) 	Discuss about finding the correlation between two variables. Let them play around with the MATLAB GUI demo, Regression_demo.m, and let them predict how to graph looks like based of correlation coefficient as well as let them calculate the linear regression line and compare that with the actual one.
<ul style="list-style-type: none"> • Investigation (Explore) 	How are the correlation, linear regression line, and residual used? How to find the linear regression line from the correlation coefficients, means and variances. How to calculate the residuals?
TIME FOR REFLECTION	
<ul style="list-style-type: none"> • Summarization (Explain & Extend) 	Summarize them all the definition related to the correlation such as linear regression, residual. Also let them understand the use of software like MATLAB.
<ul style="list-style-type: none"> • Assessment (Evaluate) 	Ask them to write or discuss about what they learned about correlation. And how it is used in real life applications such as radio communication.
<ul style="list-style-type: none"> • Homework 	Find out where it is used.

(1) Positive Correlation



(2) Negative Correlation



(3) No Correlation

