**Experiment 16**: Linear Approximations

(Edit this document as needed)

Partner 1: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Partner 2: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Part A*

a) Slope and intercept of best fit line for data, (2,1),(3,2),(4,3). Show your work.

|  |  |
| --- | --- |
| Slope |  |
| Intercept |  |

b) Slope and intercept of best fit line for data, (1,1),(3,3),(5,2). Show your work.

|  |  |
| --- | --- |
| Slope |  |
| Intercept |  |

c) Matlab verification of parts a and b

|  |  |
| --- | --- |
| Slope (problem a) |  |
| Intercept |  |

|  |  |
| --- | --- |
| Slope (problem b) |  |
| Intercept |  |

d) Matlab line fit applied to your Experiment 5, Part C results.

Plot of data and regression line.

Equation for the regression line.

e) Matlab line fit applied to your Experiment 11, Part C results.

Plot of data and regression line when V2 = 0

Equation for the regression line when V2 = 0

Plot of data and regression line when V1 = 0

Equation for the regression line when V1 = 0

f) Voltage divider measurements when ‘randomizing’ resistors

|  |  |
| --- | --- |
| Voltage, V1 | Resistor Voltage, VR2 |
| 0 |  |
| 0.5 |  |
| 1 |  |
| 1.5 |  |
| 2 |  |
| 2.5 |  |
| 3 |  |
| 3.5 |  |
| 4 |  |
| 4.5 |  |
| 5 |  |

Plot of data and regression line.

Equation for the regression line.

g) Voltage divider measurements when varying one of the resistors

|  |  |  |  |
| --- | --- | --- | --- |
| Resistor Number | Resistor Voltage, VR2 | Calculated value of R2 | Measured value of R2 using Alice Ohm Meter |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  |  |  |
| 4 |  |  |  |
| 5 |  |  |  |

Record the calculated and measured R2 values in the instructors Excel file here:

<https://docs.google.com/spreadsheets/d/1PeX5iO9ZlaSKPwtb_WWVJ-t8ghRDLN4I60zg0duKBjo/edit?usp=sharing>

Due: March. 21st 2022 at 11:59 pm eastern on Gradescope

One student submits on Gradescope and adds their partner using “add group members” option on Gradescope.