Design and implementation of algorithms and Matlab programs for practical data analysis.

Diagrams/code; calculations (with data; formula; workings and assumptions) and discussion/ comments

Task 2, Discussions, Conclusions and References.

# Task 2:

Your company has a manual 2D microscope which can measure the coordinates of 2D profiles. You have been asked to develop a least square algorithm in either Matlab or Excel to calculate the centre and radius of circular features. Given the standard uncertainty of x and y coordinates is 20 µm, calculate the uncertainties associated with the radius and centre coordinates. Describe how to reduce the measurement uncertainties.

To test your algorithm, you can use the following measurement results, the XY coordinates recorded for a ring gauge:

Measurement Results (unit: mm)

|  |  |
| --- | --- |
| X | Y |
| 75.048 | 12.019 |
| 66.332 | 44.536 |
| 42.542 | 68.323 |
| 10.004 | 77.000 |
| -22.465 | 68.329 |
| -46.265 | 44.514 |
| -54.999 | 12.022 |
| -46.275 | -20.490 |
| -22.475 | -44.254 |
| 10.035 | -52.955 |
| 42.524 | -44.278 |
| 66.323 | -20.458 |
| 75.030 | 12.034 |