



RoboAnalyzer Online Competition  
2021

*"We certify that this project was undertaken by us for the RoboAnalyzer-based online competition (ROC) conducted by Dr. Nayan M. Kakoty of Tezpur University in collaboration with Prof. S.K Saha of IIT Delhi and Mr. Rajeevlochana C.G. of Amrita Vishwa Vidyapeetham, Bengaluru Campus during May 01, 2021, to July 11, 2021."*

Team A4:

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## Components of the last task in VRM :

1. Border
2. Names
3. Emoji
4. INDIA GATE
5. Thank You

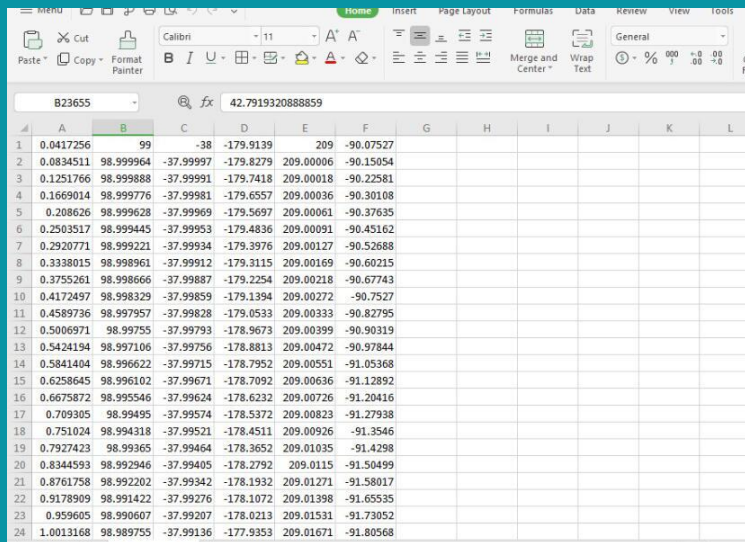
***Robot used : KukaKR5\_IND***

Prerequisite knowledge: Degree of Freedom, DH Parameters, Heterogeneous Transformation Matrix, Forward & Inverse Kinematics, Forward & Inverse Dynamics and others

# PLAN & PROCEDURE

- First and foremost, appropriate border was chosen to make our task presentable.
- Before we go into our main idea for this task, we hope you are safe and healthy. Don't forget to wear **MASK** and follow other safety precautions.
- After a small intro, as for any shape to present, we decided to draw simple shapes with a little surprise in it.
- Then, we go right into writing our names.
- Now, we present to you: **INDIA GATE**
- Procedure used for the task:
  1. The diagram/lettering was planned manually by drawing on a paper to figure out the appropriate values of final coordinates of the end effector.
  2. For the slopes and bends, the coordinates were incremented and decremented accordingly.

## Screenshot of CSV file



The screenshot shows a Microsoft Excel spreadsheet with a grid of data. The columns are labeled A through L, and the rows are numbered 1 through 24. The data consists of numerical values, likely representing coordinates or measurements. The first row (row 1) contains values: 0.0417256, 99, -38, -179.9139, 209, -90.07527. The last row (row 24) contains values: 1.0013168, 98.989755, -37.99136, -177.9353, 209.01671, -91.80568.

|    | A         | B         | C         | D         | E         | F         | G | H | I | J | K | L |
|----|-----------|-----------|-----------|-----------|-----------|-----------|---|---|---|---|---|---|
| 1  | 0.0417256 | 99        | -38       | -179.9139 | 209       | -90.07527 |   |   |   |   |   |   |
| 2  | 0.0834511 | 98.999964 | -37.99997 | -179.8279 | 209.00006 | -90.15054 |   |   |   |   |   |   |
| 3  | 0.1251766 | 98.999888 | -37.99991 | -179.7418 | 209.00018 | -90.22581 |   |   |   |   |   |   |
| 4  | 0.1669014 | 98.999776 | -37.99981 | -179.6557 | 209.00036 | -90.30108 |   |   |   |   |   |   |
| 5  | 0.208626  | 98.999628 | -37.99969 | -179.5697 | 209.00061 | -90.37635 |   |   |   |   |   |   |
| 6  | 0.2503517 | 98.999445 | -37.99953 | -179.4836 | 209.00091 | -90.45162 |   |   |   |   |   |   |
| 7  | 0.2920771 | 98.999221 | -37.99934 | -179.3976 | 209.00127 | -90.52688 |   |   |   |   |   |   |
| 8  | 0.3338015 | 98.998961 | -37.99912 | -179.3115 | 209.00169 | -90.60215 |   |   |   |   |   |   |
| 9  | 0.3755261 | 98.998666 | -37.99887 | -179.2254 | 209.00218 | -90.67743 |   |   |   |   |   |   |
| 10 | 0.4172497 | 98.998329 | -37.99859 | -179.1394 | 209.00272 | -90.7527  |   |   |   |   |   |   |
| 11 | 0.4589736 | 98.997957 | -37.99828 | -179.0533 | 209.00333 | -90.82795 |   |   |   |   |   |   |
| 12 | 0.5006971 | 98.99755  | -37.99793 | -178.9673 | 209.00399 | -90.90319 |   |   |   |   |   |   |
| 13 | 0.5424194 | 98.997106 | -37.99756 | -178.8813 | 209.00472 | -90.97844 |   |   |   |   |   |   |
| 14 | 0.5841404 | 98.996622 | -37.99715 | -178.7952 | 209.00551 | -91.05368 |   |   |   |   |   |   |
| 15 | 0.6258645 | 98.996102 | -37.99671 | -178.7092 | 209.00636 | -91.12892 |   |   |   |   |   |   |
| 16 | 0.6675872 | 98.995546 | -37.99624 | -178.6232 | 209.00726 | -91.20416 |   |   |   |   |   |   |
| 17 | 0.709305  | 98.99495  | -37.99574 | -178.5372 | 209.00823 | -91.27938 |   |   |   |   |   |   |
| 18 | 0.751024  | 98.994318 | -37.99521 | -178.4511 | 209.00926 | -91.3546  |   |   |   |   |   |   |
| 19 | 0.7927423 | 98.99365  | -37.99464 | -178.3652 | 209.01035 | -91.4298  |   |   |   |   |   |   |
| 20 | 0.8344593 | 98.992946 | -37.99405 | -178.2792 | 209.0115  | -91.50499 |   |   |   |   |   |   |
| 21 | 0.8761758 | 98.992202 | -37.99342 | -178.1932 | 209.01271 | -91.58017 |   |   |   |   |   |   |
| 22 | 0.9178909 | 98.991422 | -37.99276 | -178.1072 | 209.01398 | -91.65535 |   |   |   |   |   |   |
| 23 | 0.959605  | 98.990607 | -37.99207 | -178.0213 | 209.01531 | -91.73052 |   |   |   |   |   |   |
| 24 | 1.0013168 | 98.989755 | -37.99136 | -177.9353 | 209.01671 | -91.80568 |   |   |   |   |   |   |

Picture or screenshot of the task output.





The result in VRM

Difficulties Faced and improvements that can be made:

The environment of VRM (in RoboAnalyzer software) can be made more user friendly by-

- ❑ Including an undo button to go back to the previous position.
- ❑ A couple of features that can go to the previous positions and next positions respectively to give a walk through the steps.
- ❑ A scrolling feature to move up and down on the working space.

Benefits of this programme:

- ❑ Exposure to the robotics domain.
- ❑ Introduction to the mathematical aspects of robotics
- ❑ Enhancement of soft skills.
- ❑ Interaction with renowned experts in this field

THANK YOU