1. **2D Ballistic Deposition Simulator:**

The Following Folder Contains the Code [2DBD.f95] and Application [2DBD.exe] files which is used to simulate Ballistic Deposition. upon giving the input to the following questions:

Enter the Length of the Box:

Enter No. of MC Cycles:

Enter No. of Repetitions:

Create Display file for o/p ? (0 = No / 1 = Yes):

gives 2 or 3 output files depending upon the input i.e.

[log.dat] Store’s log of Elapsed time along with input data

[std.dat] Store’s Data to Calculate Standard Deviation (Roughness or Surface Width) of all Repetitions

[final.dat] Store’s the (x, y) Coordinates for the display o/p of BD simulation

1. **BD with Random Sticking Probability:**

The Following Folder Contains the Code [2DBD\_stick\_prob.f95] and Application [2DBD\_stick\_prob.exe] which is the same as 2D Ballistic Deposition Simulator with an added variable called sticking probability that ranges between 0 to 1.

For sticking probability = 0, we get Random Deposition.

1. **BD with Random Initial Height:**

The Folder Contains the Code [2DBD\_centre\_seed.f95] and Application [2DBD\_centre\_seed.exe]

which is the same as 2D Ballistic Deposition Simulator with an initial hight at the centre of the box = Length of the box.

1. **Animation Program:**

Upon copying the [final.dat] file created after running the BD simulation application to this folder, and running the code [animate.f95] or Application [animate.exe] and entering applicable input to the questions:

Enter No. of MC Cycles:

Enter the Length of the Box:

generates a file [animate.dat] which can further be used to generate a .gif animated simulation for our BD using GNUPLOT. (Change the GNUPLOT code w. r. t. scale of our BD)

1. **Calculation Programs:**
   1. **Avg. Standard Deviation Program:**

Upon copying the [std.dat] file created after running the BD simulation application to this folder, and running the code [avg\_std.f95] or Application [avg\_std.exe] and entering applicable input to the questions:

Enter No. of MC Cycles:

Enter the Length of the Box:

generates a file [avgstd.dat] that stores the calculated data of the standard deviation averaged out w. r. t. the total number of reptations made. Use GNUPLOT on logscale to verify the results.

* 1. **Least Square Fit Program:**

After verifying the results using GNUPLOT for [avgstd.dat] copy the file to Least Square fit program and run the code [LSF.f95] or Application [LSF.exe] and enter the applicable input to the questions:

Enter file name: *(type in “avgstd.dat”)*

Enter Number of Observations: *(Enter the Total Rows in the avgstd.dat file)*

Enter Starting Point: *(Starting point of the graph where we visually see stable Linear growth in logscale)*

Enter Ending Point: *(Ending point of the graph where we visually see Saturation)*

generates a file [LSF.dat] That gives us the simulation values for the Exponents to the Equation:

i.e.

Simulate for various values of Length of Box and average out the value of as it does not vary w. r. t Length of box. Note down the value of .

* 1. **Saturation Point Program:**

After verifying the results using GNUPLOT for [avgstd.dat] copy the file to Saturation Point Program and run the code [saturation.f95] or Application [saturation.exe] and enter the applicable input to the questions:

Enter file name: *(type in “avgstd.dat”)*

Enter Number of Observations: *(Enter the Total Rows in the avgstd.dat file)*

Enter Starting Point: *(Starting point of the graph where we visually see stable Linear growth in logscale)*

Enter Ending Point: *(Ending point of the graph where we visually see Saturation)*

generates a file [Saturation.dat] That gives us the saturation value i.e. for the simulated data from which we can find the Exponents using the Equation:

Simulate for various values of Length of Box and plot a log scale chart of and find the value of using the chart.

* 1. **Correlation Program:**

After noting down the values for and that is calculated respectively for different values of Length of the box, use these values to generate the correlation graph coordinates for every simulation made with different Length of the box. Copy the [avgstd.dat] in the folder and run the code [correlation.f95] or Application [correlation.exe] and enter the applicable input to the questions:

Enter No. of MC Cycles:

Enter Length of Box:

Enter value of alpha:

Enter value of z:

generates a file [correlation.dat] which is supposed to be saved for different Length of box values which later on follow the same curve when superimposed over one another. It also generates another file [correlation\_log.dat] that stores log of Elapsed time along with input data.

* 1. **Porosity:**

Upon copying the [final.dat] file created after running the BD simulation application to this folder, and running the code [porosity.f95] or Application [porosity.exe] and entering applicable input to the questions:

Enter the Length of the Box:

Enter No. of MC Cycles:

Generates a file [porosity.dat] which gives us how the porosity changes after every particle is deposited and the final porosity of our simulation.