

## Computational Physics Lab 4

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20PH20028

### Gauss-seidel method

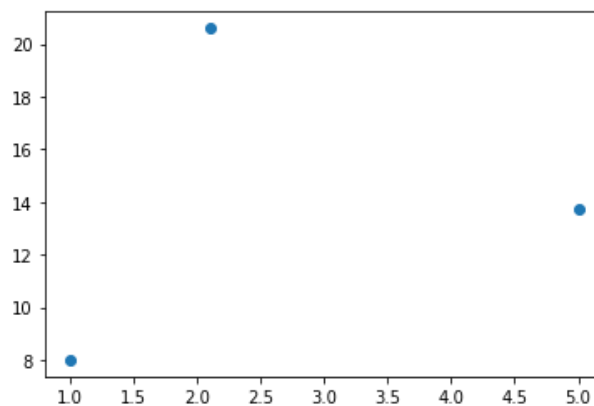
- a) The given matrix **A** is not strictly diagonally dominant on row 3 and row 4
- b) For Given **A** and **b**, after solving by the gauss seidel method, we get the solution vector **X** as **X**=[-1.116 -1.3858, -4.2543, 1.4957, 0.3000]

By  $X = A^{-1}b$  we get X to be [-1.1222 -1.3890 -4.24606 1.4950 0.3005] we can see that we have got the correct solution with a great accuracy

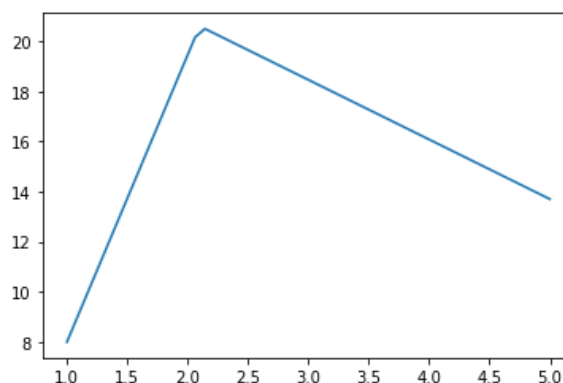
### Linear Interpolation 1

Given the three data points  $(x, y) = (1.0, 8.0)$ ,  $(2.1, 20.6)$  and  $(5.0, 13.7)$ , write a program to return the value of y for any arbitrary x in the range  $[1.0, 5.0]$  using two-point linear interpolation.

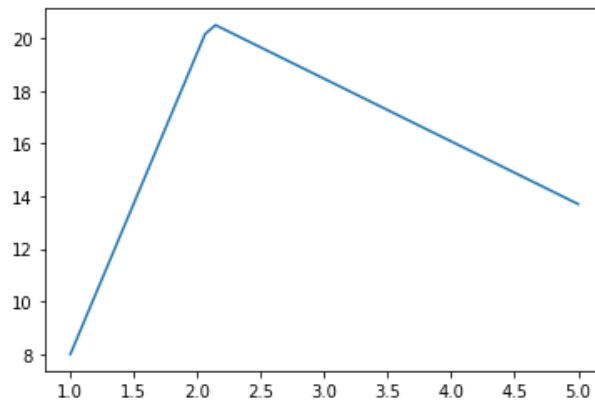
Plotting the given points we get this



Using interpolation code we get

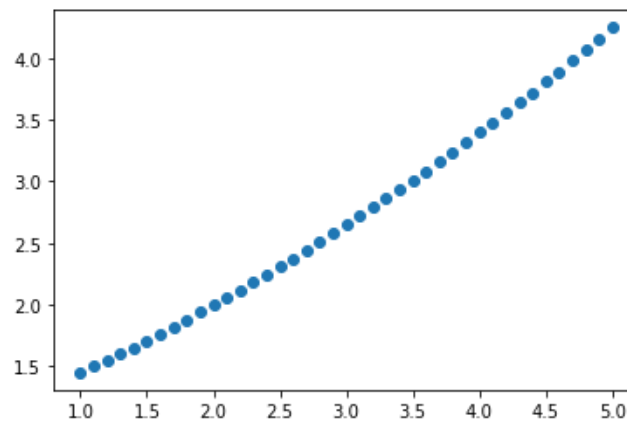


Using an inbuilt function for cross-checking, we get the following plot.

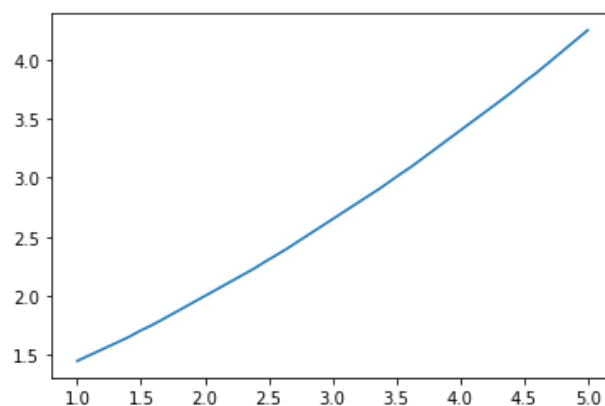


## Linear Interpolation 2

Write a code for two-point segment linear interpolation for the dataset given in file points.txt  
Plotting the given 40 data points, we get the following plot



The interpolated graph is, so it is correct.



So, we have written a code to solve the system of linear equations using the gauss-seidel method and linear interpolation.