



# MiniLab-8



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# Example - 1

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Solve the following linear equation:

$$2.3 = 5.3x + 1.2y - 2.6z$$

$$1.9 = 6.1x - 2.3y + 6.2z$$

$$3.6 = 2.2x - 4.7y - 3.6z$$

## Example - 2

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Find Cholesky factorization of the following matrix:

$$A = \begin{bmatrix} 4 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 8 \end{bmatrix}$$

**Hint:**

`np.linalg.cholesky`

## Example - 3

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Find the minimum of the following function within the interval of 0-6 via Brent method:

$$f(x) = x^4 + 3(x-2)^3 - 15x^2 + 1$$

**Hint:**

```
from scipy import optimize as opt  
opt.minimize_scalar(f, method='Brent')
```

## Example - 4

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Find the minimum of the following function around 0 by using Newton method:

$$f(x) = x^3 - 3x + 1$$

**Hint:**

```
from scipy.optimize import newton  
a = newton(f,0)
```

## Example - 5

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Find the first and second derivative of the following function at  $x=2$ .

$$f(x) = x^3 - 3x + 1$$

**Hint:**

```
from scipy.misc import derivative  
first = derivative(f,x,dx=1e-6,n=1)  
second = derivative(f,x,dx=1e-6,n=2)
```