Math Document Template

C ANISH

***Abstract*—This is a document explaining a question about the concept of finding the roots of a quadratic equation.**

Download all python codes from

```
svn co https://github.com/chakki1234/summer
    -2020/trunk/linearalg/codes
```

and latex-tikz codes from

```
svn co https://github.com/chakki1234/summer
    -2020/trunk/linearalg/figs
```

1 Problem

Verify whether 2 and 0 are zeroes of the polynomial $x^2 - 2x$.

2 Construction

2.1. Draw Fig. 2.1.

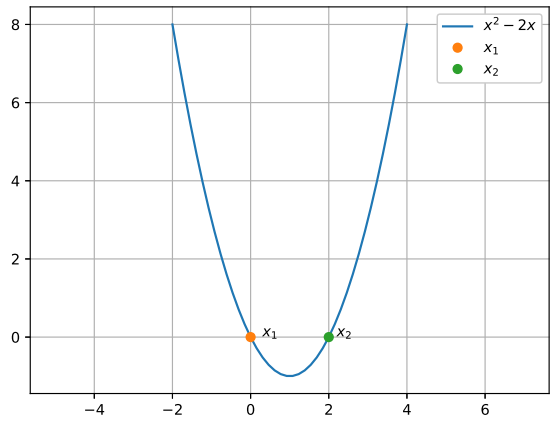

Fig. 2.1: $x^2 - 2x$ generated using python

Solution: The following Python code generates Fig. 2.1

```
codes/conics.py
```

3 Solution

Solution: $p(x, y) = Ax^2 + Bxy + Cy^2 + Dx + Ey + F$ can be represented as follow in the vector form:

$$x^T \begin{pmatrix} A & \frac{B}{2} \\ \frac{B}{2} & C \end{pmatrix} x + \begin{pmatrix} D & E \end{pmatrix} x + F = 0 \tag{1.1}$$

The given equation can be represented as follows in the vector form:

$$x^T \begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix} x + \begin{pmatrix} -2 & 0 \end{pmatrix} x + 0 = 0 \tag{1.2}$$

To find the roots $y = 0$:

$$X^2 - 2x = 0 \tag{1.3}$$

$$x(x - 2) = 0 \tag{1.4}$$

$$x = 0, 2 \tag{1.5}$$