

# Math Document Template

Jayati Dutta

**Abstract**—This is a simple document explaining how to get equation of line that passes through a particular point in a particular direction.

Download all and latex-tikz codes from

svn co <https://github.com/gadepall/school/trunk/ncert/geometry/figs>

## 1 PROBLEM

Find the equation of the line that passes through  $(2 -1 4)^T$  and is in the direction  $(1 2 -1)^T$

## 2 SOLUTION

2.1. The figure for the straight lines obtained in the question looks like Fig. 2.2. The line at the direction of  $(1 2 -1)^T$  is represented by  $\mathbf{b}$  and the line that passes through  $(2 -1 4)^T$  is represented by  $\mathbf{a}$ .

2.2. Generating the points and the straight lines using python.

**Solution:** The following Python code generates Fig. 2.2

codes/line\_Eqn1.py

As the line at the direction of  $(1 2 -1)^T$  is represented by  $\mathbf{b}$ , so  $\mathbf{b}$  is the direction vector and the point is  $\mathbf{a} = (2 -1 4)^T$  through which the line passes through.

From the problem statement, we got:

$$\mathbf{a} = \begin{pmatrix} 2 \\ -1 \\ 4 \end{pmatrix} \quad (2.1)$$

So, let us consider another point  $P$  with  $\mathbf{r} = (x \ y \ z)^T$  on the line that passes through  $\mathbf{a}$ .

$$\mathbf{r} = \mathbf{a} + \lambda \mathbf{b} \quad (2.2)$$

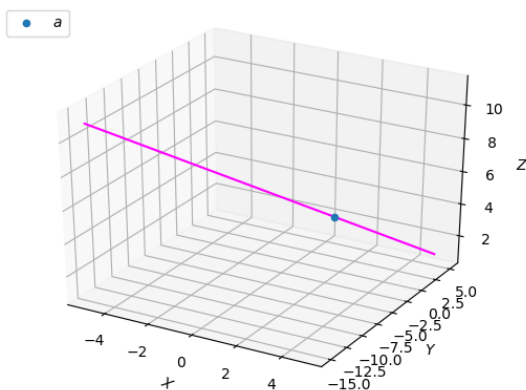


Fig. 2.2: The Straight line passing through a point at a particular direction