Lecture 4: Step Plots in LaTeX

What is a Step Plot?

A step plot is used when data changes at specific points and remains constant between those points. It is often used in time-series data where values shift suddenly rather than gradually.

Why Use Step Plots?

- Shows sudden changes clearly
- Useful for signals, sensor states, event logs
- Helps visualize piecewise-constant data

Things That Always Stay the Same

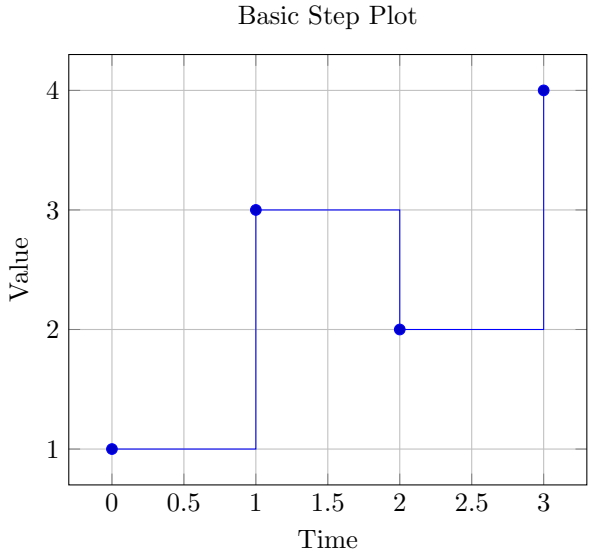
- `tikzpicture` → drawing area
- `axis` → creates axes + grid
- `addplot` → draws the step graph

Things That Can Change

- Step direction (left, right, center, mid)
- Line style (dashed, thick)
- Marker style
- Colors

1) Basic Step Plot

```
\begin{tikzpicture}
\begin{axis}[
    title={Basic Step Plot},
    xlabel={Time},
    ylabel={Value},
    grid=major
]
\addplot+[const plot] coordinates {(0,1) (1,3) (2,2) (3,4)};
\end{axis}
\end{tikzpicture}
```



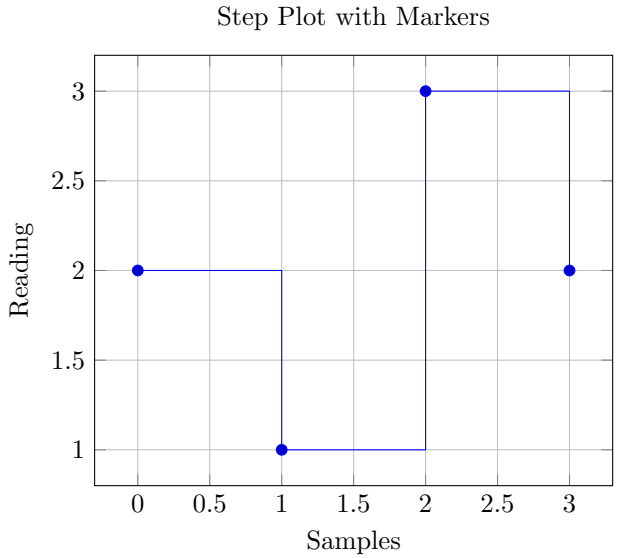
Key Parameters:

- `const plot` → turns line into a step graph

2) Step Plot with Markers

```
\begin{tikzpicture}
\begin{axis}[
    title={Step Plot with Markers},
    xlabel={Samples},
    ylabel={Reading},
    grid=major
]
\addplot+[const plot,mark=*] coordinates {(0,2) (1,1) (2,3) (3,2)};
\end{axis}
```

```
\end{tikzpicture}
```



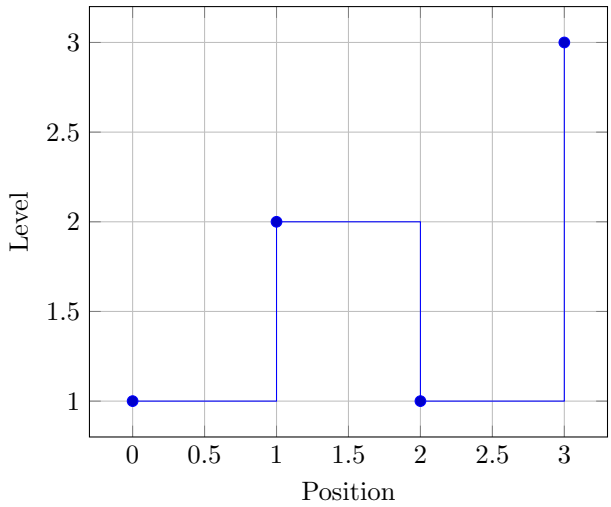
Extra:

- `mark=*` → shows circular dots at each change

3) Step Plot with Different Step Direction

```
\begin{tikzpicture}
\begin{axis}[
    title={Right Step Style},
    xlabel={Position},
    ylabel={Level},
    grid=major
]
\addplot+[const plot,step=end] coordinates {(0,1) (1,2) (2,1) (3,3)};
\end{axis}
\end{tikzpicture}
```

Right Step Style



Explanation:

- `step=end` → steps drawn to the right of points

Exercise (Write Code Yourself)

Using this data, draw the following:

X	Y
0	1
1	4
2	3
3	5

Tasks:

- A basic step plot
- A step plot with markers
- A right-step styled plot

Exercise Solutions (No Code)

- Basic: Steps go $1 \rightarrow 4 \rightarrow 3 \rightarrow 5$
- With markers: Same steps but with dots at each point
- Right-step: Steps shift visually to the right before rising