Some LaTeX Fun

Rebecca White
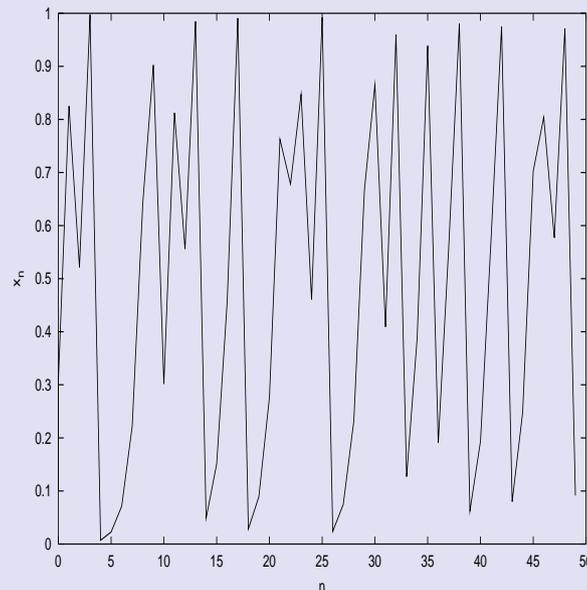
`www.mathstat.dal.ca/~wrebecca/latex.html`

Importing Graphs

We need to include the package epsfig.sty in our header and then a .eps or a .ps file is imported using the following command:

```
\begin{center}
\includegraphics[height=1.5in,width=1.5in,angle=-90]{graph.ps}
\end{center}
```

This gives the following graph:

To get a caption and to be able to reference this graph, we use the `figure` environment.

```
\begin{figure}[hbtp]
\centering
\includegraphics[height=1.5in,width=1.5in,angle=-90]{graph.ps}
\label{fabugraph}\caption{my fabulous graph}
\end{figure}
```
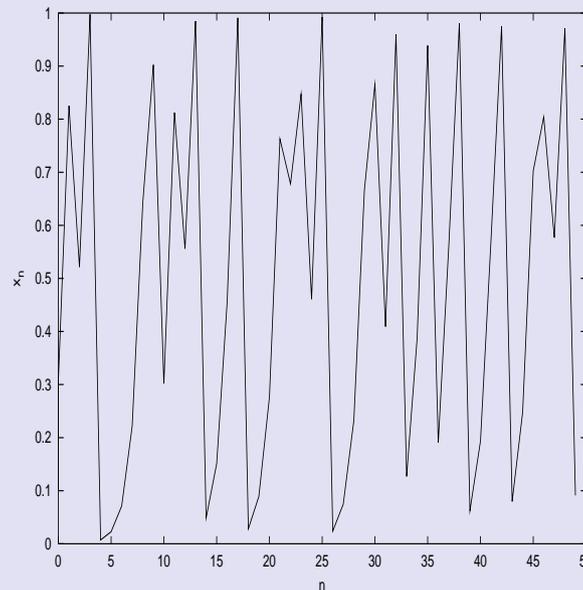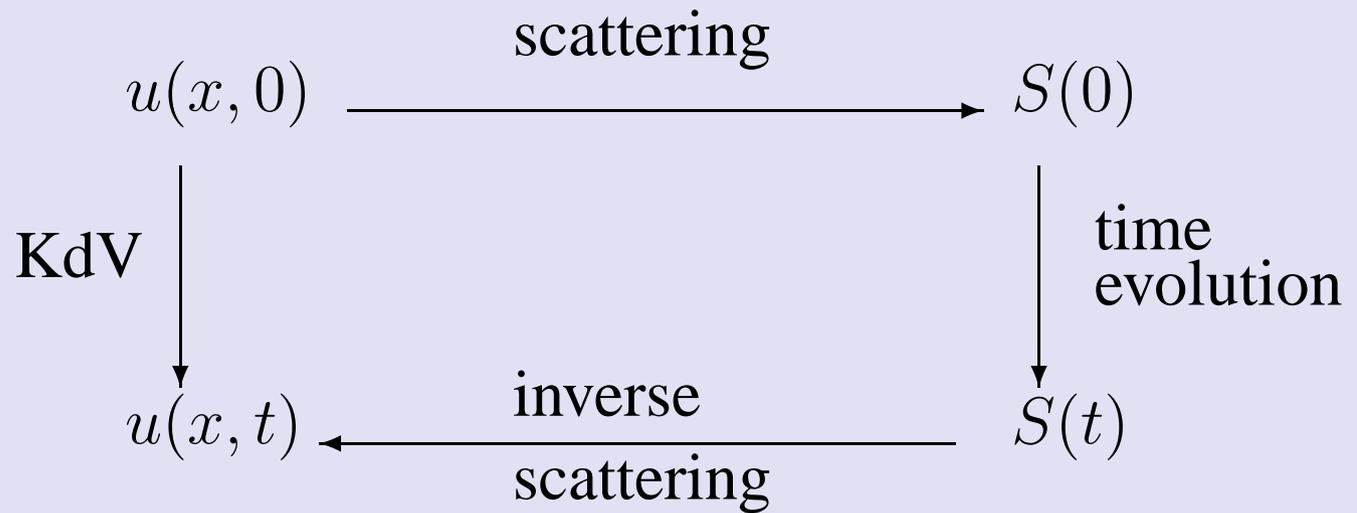

Figure 1: my fabulous graph

Scaled Picture

The `scaledpicture` environment is available through the package fullpict.sty.

```
\begin{scaledpicture}{70}(20,10)(0,0)
\put(2,2){$u(x,t)$} \put(2,8){$u(x,0)$} \put(18,2){$S(t)$}
\put(18,8){$S(0)$} \put(6,8){\vector(1,0){11.5}}
\put(3,7){\vector(0,-1){4}}\put(18.5,7){\vector(0,-1){4}}
\put(17,2){\vector(-1,0){11.5}} \put(9,9){scattering}
\put(9,2.5){inverse} \put(9,1){scattering}
\put(0,5){KdV}\put(19.5,5.5){time} \put(19.5,4.5){evolution}
\end{scaledpicture}
```

Example of Scaled Picture

$$u(x,0) \xrightarrow{\text{scattering}} S(0)$$

KdV (downward from $u(x,0)$ to $u(x,t)$)

time evolution (downward from $S(0)$ to $S(t)$)

$$u(x,t) \xleftarrow[\text{scattering}]{\text{inverse}} S(t)$$

More Scaled Picture Commands

1. `\join`

   `\join(x_1,y_1)(x_2,y_2)`

   This command joins points together with a line. You can put any number of points here.

2. `\circle`

   `\put(x_1,y_1){\circle{r}}`

3. `\arc`

   `\put(x_1,y_1){\arc(p,q){deg}}`

Graphs.sty

Another useful diagram drawing package is graphs.sty. This is good for drawing graph theory diagrams.
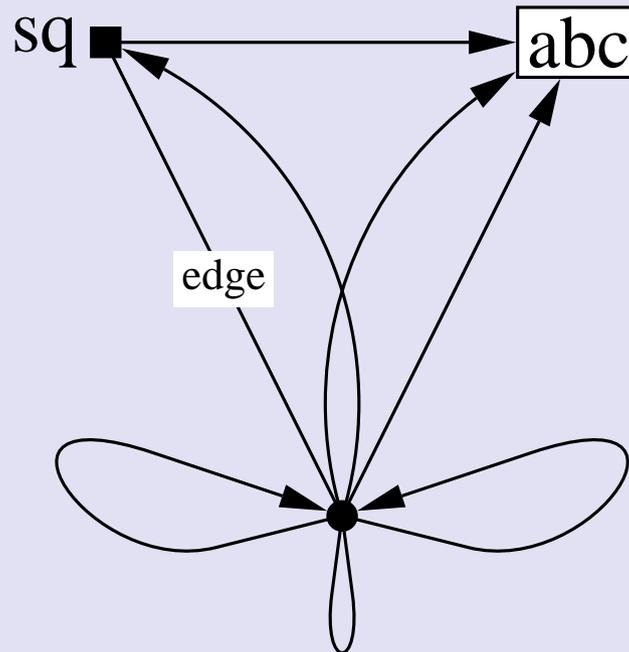
```
\begin{graph}(x_1,x_2)(d_1,d_2)
...
\end{graph}
```

The drawing commands do not immediately generate the picture. Only at the end of the environment, the lines, then edges, nodes and then texts are outputted.

```
\begin{graph}(4,4)(-2,0)
\squarenode{Sq}(-1.5,3.5) \textnode{Te}(1.5,3.5){abc}
\roundnode{Ro}(0,0.5)
\diredge{Sq}{Te}\edge{Sq}{Ro}\diredge{Ro}{Te}
\dirbow{Ro}{Sq}{-0.2} \dirbow{Ro}{Te}{0.2}
\dirloopedge{Ro}(-0.8,-0.2)(-1.2,0.4)\dirloopedge{Ro}(0.8,-0.2)(1.2,0.4)
\loopedge{Ro}{15}(0,-0.5)\autonodetext{Sq}[w]{sq}
\edgetext{Sq}{Ro}{\tiny edge}
\end{graph}
```

`minipage` environment

```
\begin{minipage}[b]{0.45\linewidth}
This is where we would put whatever we want on the left hand side of
the page. "[b]" refers to the bottoms of our minipage lining up
\end{minipage}
\hfill
\begin{minipage}[b]{0.45\linewidth}
The "{0.45\linewidth}" refers to the width of this page we are
creating.  If we made it more than half the page (i.e. 0.56) it
would overlap with the other side.
\end{minipage}
```

The

`{0.45\linewidth}`

This is where we would put whatever we want on the left hand side of the page. "[b]" refers to the bottoms of our minipage lining up

refers to the width of this page we are creating. If we made it more than half the page (i.e. 0.56) it would overlap with the other side.

```
\begin{minipage}[t]{0.45\linewidth}
Here, we have changed it to be "[t]" which means that we want the
top of our minipages to line up.
\end{minipage}
\hfill
\begin{minipage}[t]{0.45\linewidth}
Using "t" or "b" as well as the amount of the linewidth takes some
playing.  Using starting with "[b]" is a good idea and change it if
necessary.
\end{minipage}
```

Here, we have changed it to be "[t]" which means that we want the top of our minipages to line up.

Using "t" or "b" as well as the amount of the linewidth takes some playing. Using starting with "[b]" is a good idea and change it if necessary.
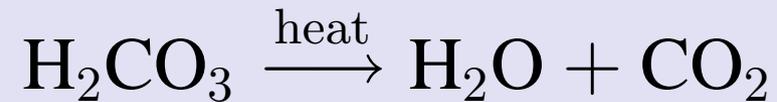
We note here that anything can be put inside these minipages including figures and equations. Minipages are useful for putting two graphs next to each other or for putting text next to a diagram.

Some Extras

1. `\stackrel`

```
$$\mbox{H}_2\mbox{CO}_3 \stackrel{\rm heat}
{\longrightarrow} \mbox{H}_2\mbox{O} + \mbox{CO}_2$$
```

which gives

$$H_2CO_3 \stackrel{\text{heat}}{\longrightarrow} H_2O + CO_2$$

2. cases

```
$$f = \begin{cases} 0, & x<0\\
1, & x>0
\end{cases}$$
```

$$f = \begin{cases} 0, & x < 0 \\ 1, & x > 0 \end{cases}$$

3. Counters

Sometimes we want to change the counters on our equations or on our lists:

```
\setcounter{enumi}{6}
\setcounter{page}{13}
\setcounter{equation}{4}
```

Spacing

Two extremely useful spacing commands are `\vspace` and `\hspace`.

        `\vspace{2ex}`   `\hspace{2in}`

One use is as follows.

`l\vspace{-1cm}R`

to give $\mathbb{R}$

Spacing in Math Mode

1. $\;$

   - a thick space

2. $\:$

   - a medium space

3. $\,$

   - a thin space

4. $\!$

   - a negative thin space