The BYUTextbook Class

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Sometimes you will want to center things on the page rather than between the margins, since the margin is big to make room for figures. This page shows how to do that.

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Chapter 1

The Derivative

1.1 Basic Derivatives

Blah blah

Chapter 2

An Example Chapter

General Notes:

- Many of the commands and environments need several runs of LaTeXto get the formatting right. If something looks weird, try compiling several more times.
- The margin figure and inline figure commands set the label of the figure to be the same as the file name.

We are still cleaning up and improving as we go along. The following shows examples of several of the environments that can be created. Feel free to modify the code and use as you like, but change the name if you do.

2.1 Equation Notes

Notes can be put inside the equation by the number

$$E = mc^2, \qquad \text{(Einstein's famous equation)} \tag{2.1}$$

inside the equation by the equation

$$E = mc^2, \qquad \text{(Einstein's famous equation)} \tag{2.2}$$

or out in the margin

$$E = mc^2, \tag{2.3}$$

(Einstein's famous equation)

2.2 The Example Environment

The example environment is designed for displaying a sample problem and then a sample solution. It is set off from the main text with a vertical bar that runs next to the problem

Example 2.1

How much wood could a woodchuck chuck if a woodchuck could chuck wood?

Solution: Suspendisse vel felis. Ut lorem lorem, interdum eu, tincidunt sit amet, laoreet vitae, arcu. Aenean faucibus pede eu ante. Praesent enim elit, rutrum at, molestie non, nonummy vel, nisl. Ut lectus eros, malesuada sit amet, fermentum eu, sodales cursus, magna. Donec eu purus. Quisque vehicula, urna sed ultricies auctor, pede lorem egestas dui, et convallis elit erat sed nulla. Donec luctus. Curabitur et nunc. Aliquam dolor odio, commodo pretium, ultricies non, pharetra in, velit. Integer arcu est, nonummy in, fermentum faucibus, egestas vel, odio.

In Example 2.1, we illustrated how to make the example environment. Page breaks can be awkward and sometimes need some manual intervention.

2.3 The Derivation Environment

The derivation environment sets of a chunk of text with a vertical bar and gives it a title. We use it to set of derivations that get in the way of readability.

This derivation is offset from the text

Suspendisse vel felis. Ut lorem lorem, interdum eu, tincidunt sit amet, laoreet vitae, arcu. Aenean faucibus pede eu ante. Praesent enim elit, rutrum at, molestie non, nonummy vel, nisl. Ut lectus eros, malesuada sit amet, fermentum eu, sodales cursus, magna. Donec eu purus. Quisque vehicula, urna sed ultricies auctor, pede lorem egestas dui, et convallis elit erat sed nulla. Donec luctus. Curabitur et nunc. Aliquam dolor odio, commodo pretium, ultricies non, pharetra in, velit. Integer arcu est, nonummy in, fermentum faucibus, egestas vel, odio.

Sed commodo posuere pede. Mauris ut est. Ut quis purus. Sed ac odio. Sed vehicula hendrerit sem. Duis non odio. Morbi ut dui. Sed accumsan risus eget odio. In hac habitasse platea dictumst. Pellentesque non elit. Fusce sed justo eu urna porta tincidunt. Mauris felis odio, sollicitudin sed, volutpat a, ornare ac, erat. Morbi quis dolor. Donec pellentesque, erat ac sagittis semper, nunc dui lobortis purus, quis congue purus metus ultricies tellus. Proin et quam. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Praesent sapien turpis, fermentum vel, eleifend faucibus, vehicula eu, lacus.

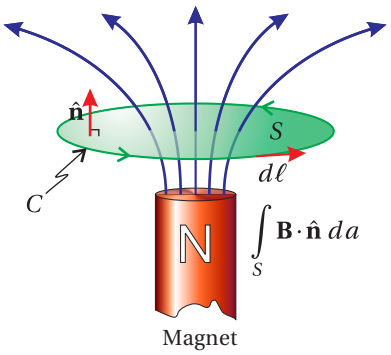

Figure 2.1 Faraday's law.

2.4 Margin Figures

We've found that it is easier to keep figures near the appropriate place in the text if they are put in the margin next to the paragraph. The marginfig command does this, as in Fig. **??**. By default, the figure is placed right next to the text where the command is located, but sometimes you need to move it. There is an optional

length argument for that moves the figure up or down. The first required argument is the file name, and by default the filename is also used as the label. You can also give your own label in the caption text, as shown in the code for Fig. 2.1 if you don't like this convention.

2.5 Inline Figures

If you want inline figures right where you put the command, use inlinefig.

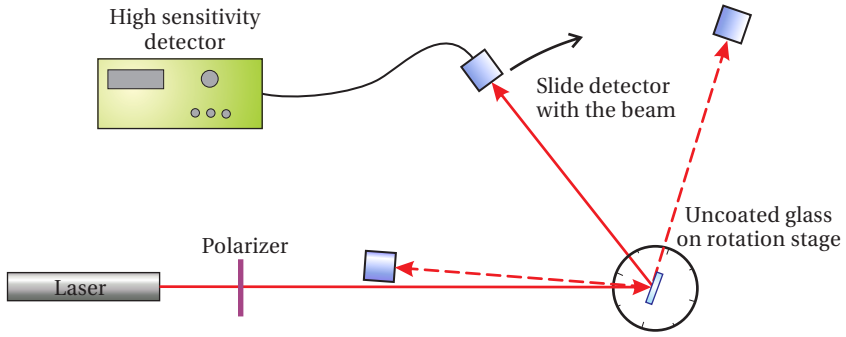

Figure 2.2 Experimental setup.

This command can have awkward page breaks if you aren't careful, but can be useful especially in problems. As before, the default label is the file name, but you can choose your own if you don't like it.

2.6 Wide Figures

Regular figures can be included as usual. If you need an extra wide figure that extends in the margin, you can use the hacked-together inneralign command to get it to extend into the correct margin. (Several compilations may be necessary to

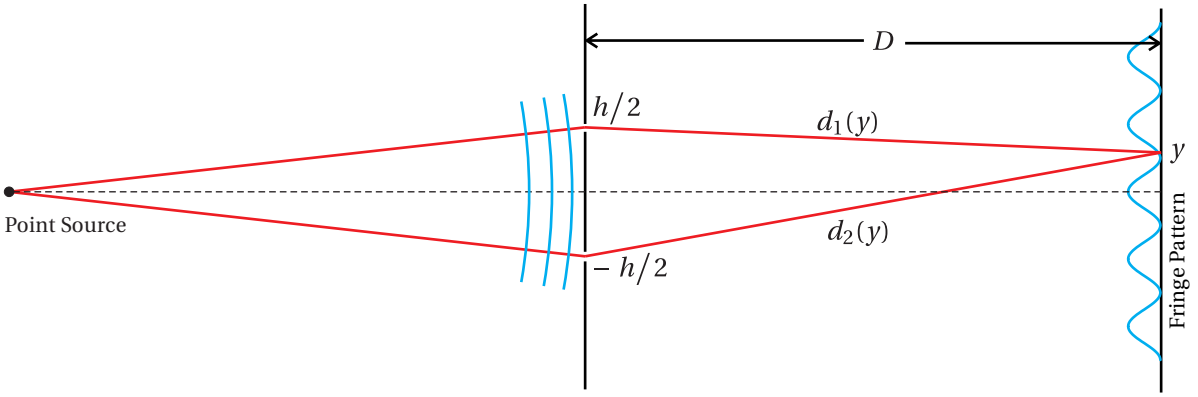

Figure 2.3 A point source produces coherent (locked phases) light. When this light which traverses two slits and arrives at a screen it produces a fringe pattern.

get it to realize which margin is correct. This construction is illustrated in Fig. 2.3.

2.7 Person Feature

René Descartes (1596-1650, French) was born in in La Haye en Touraine (now Descartes), France. His mother died when he was an infant. His father was a member of parliament who encouraged Descartes to become a lawyer. Descartes graduated with a degree in law from the University of Poitiers in 1616. In 1619, he had a series of dreams that led him to believe that he should instead pursue science. Descartes became one of the greatest mathematicians, physicists, and philosophers of all time. He is credited with inventing the cartesian coordinate system, which is named after him. For the first time, geometric shapes could be expressed as algebraic equations. (Wikipedia)

We think science is more interesting if you can put it in a personal context. Sometimes you can do this in the text, but sometimes it is nice to have a picture and some basic facts. The personfeature command will do this for you. Since these may need to be vertically adjusted to avoid margin figures or page breaks, there is an optional length argument.

2.8 Code Listings

We typeset code for several lab manuals using this class. We have the class set up so that it writes a sample code file with a Matlab extension (.m) as well as displaying it. Then we can post the sample code files with the manual. This is illustrated in Listing 2.1. For now, everything is hardcoded for Matlab syntax formatting and file names.

Listing 2.1 (ch2ex1.m)

```
clear; close all;

N=100;

a = zeros(1,N);
% Fill the a array
for n=1:N
    a(n) = 1 / n^2;
end

S = zeros(1,N);
% Do the running sum
for m=1:N
    S(m) = sum( a(1:m) );
end

% Now let's plot S vs. m
m=1:N
plot(m,S)
```

You can override the auto-naming convention as in Listing 2.2

Listing 2.2 (DisplayPi.m)

```
clear;
close all;

% This is how you display the value of pi
pi
```

2.9 Margin Notes

You can make little margin reminder notes with a character bullet of your choice using the reminder command, like this:

For a list of icons, see the Fourier package documentation. (That package defines the font and character set for this class).

☞ A reminder is basically just a marginpar with a little icon next to it.

2.10 Margin Tables

Sometimes it is nice to put data in the margins in tabular form. Table 2.1 is an example of a text table, and you can put numbers and equations in such a table too. Obviously the data has to fit well in the narrow form factor. As with the other margin elements, there is an optional length argument to adjust vertical position. The required height argument specifies the size of the colored box.

Radiant Power (of a source): Electromagnetic energy. Units: $W = J/s$

Radiant Solid-Angle Intensity (of a source): Radiant power per steradian emitted from a point-like source (4π steradians in a sphere). Units: W/Sr

Radiance or Brightness (of a source): Radiant solid-angle intensity per unit projected area of an extended source. The *projected* area foreshortens by $\cos\theta$, where θ is the observation angle relative to the surface normal. Units: $W/(Sr \cdot cm^2)$

Radiant Emittance or Exitance (from a source): Radiant Power emitted per unit surface area of an extended source (the Poynting flux leaving). Units: W/cm^2

Irradiance (to a receiver) Often called intensity: Electromagnetic power delivered per area to a receiver: Poynting flux arriving. Units: W/cm^2

Table 2.1 Radiometric quantities and units.

Exercises

The exercise section is designed to organize problems by section, like this

Exercises for 2.1 Equation Notes

P2.1 FileName A hard problem

L2.2 easure the thing in P 2.1.