

L^AT_EX Workshop

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Goal: Learn to typeset something like this

The last equality follows by observing that $(\Omega \setminus B_R(\mathbf{r}_0)) \cap B_R(\mathbf{r}_0) = \emptyset$, and the argument above. The RHS is the electric flux generated by a charged sphere, and so:

$$\Phi(R) = \frac{Q(R)}{\varepsilon_0} = \frac{1}{\varepsilon_0} \int_{B_R(\mathbf{r}_0)} \rho(\mathbf{r}') \, d\mathbf{r}' = \frac{1}{\varepsilon_0} \rho(\mathbf{r}'_c) |B_R(\mathbf{r}_0)| \quad \text{with } r'_c \in B_R(\mathbf{r}_0)$$

Where the last equality follows by the mean value theorem for integrals. Finally for the Squeeze theorem and the continuity of ρ :

$$\nabla \cdot \mathbf{E}_0(\mathbf{r}_0) = \lim_{R \rightarrow 0} \frac{\Phi(R)}{|B_R(\mathbf{r}_0)|} = \frac{\rho(\mathbf{r}_0)}{\varepsilon_0}$$

7.2 Deriving Coulomb's law from Gauss's law

Strictly speaking, Coulomb's law cannot be derived from Gauss's law alone, since Gauss's law does not give any information regarding the curl of \mathbf{E} (see Helmholtz decomposition and Faraday's law). However, Coulomb's law can be proven from Gauss's law if it is assumed, in addition, that the electric field from a point charge is spherically symmetric (this assumption, like Coulomb's law itself, is exactly true if the charge is stationary, and approximately true if the charge is in motion).

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- 4 Mathematics
- 5 Bibliography management
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What is Typesetting

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Source code spacing

Special characters

Commands

Environments

Document structure

Spacing and newlines

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Emphasis, Bold, Italic, ...

```
1 This is \emph{emphatized}.
2 You may also use
3 \textbf{Bold},
4 \textit{Italic},
5 \textsf{Sans-Serif},
6 \textsc{SmallCaps},
7 \textrm{Roman},          % with serif
8 \texttt{Typewriter}.    % monospaced
```

This is *emphatized*. You may also use **Bold**, *Italic*, Sans-Serif, SmallCaps¹, Roman or Typewriter.

¹The font used in this presentation does not have a smallcaps style

Lists

```
1 \begin{itemize}
2   \item Tomatoes
3   \item Peppers
4   \item Broccoli
5 \end{itemize}
```

```
1 \begin{enumerate}
2   \item Discovery coffee
3   \item Get addicted
4   \item Congratulations
5 \end{enumerate}
```

Itemize

- Tomatoes
- Peppers
- Broccoli

Enumerate

- 1 Discovery coffee
- 2 Get addicted
- 3 Congratulations

Description

```
1 \begin{description}
2   \item[Programmer] A person who is paid to
      professionally scream at a computer.
3   \item[Manager] A person who appears to know how
      all tasks should be accomplished but can't
      actually do any of those tasks themselves.
4 \end{description}
```

Programmer A person who is paid to professionally scream at a computer.

Manager A person who appears to know how all tasks should be accomplished but can't actually do any of those tasks themselves.

Table: Floats placing permissions

Specifier	Permission
h	Place around here
t	At the top of the page
b	At the bottom of the page
p	On a special page containing only floats
!	“I don’t care if it will be ugly”
H ²	Place exactly here (may look very ugly)

²Requires the “float” package, i.e. “\usepackage{float}”

Tables and tabular

```
1 \begin{table}[h]
2   \caption{Not up to date numbers}
3   \begin{tabular}{l r r}
4     \toprule1
5     Country & Infected & Deaths \\
6     \midrule1
7     China      & 80'652 & 3'070 \\
8     South Korea & 7'041  & 44 \\
9     Italy      & 5'833  & 233 \\
10    \bottomrule1
11  \end{tabular}
12 \end{table}
```

¹ Pro Tip

Add “\usepackage{booktabs}” to use rulers.

Tables and tabular

Table: Not up to date numbers

Country	Infected	Deaths
China	80'652	3'070
South Korea	7'041	44
Italy ³	5'833	233

³ Congratulations, your public health worse than Iran's

Figures

Cross-References

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Math environments

Math symbols and fonts

Equations

Spacing in math mode

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TheBibliography

External bibliography

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Source code listings

Plots

