

times (mathptmx)

```
\documentclass[a4paper]{article}
\usepackage{fixltx2e}           % fix latex-e bugs
\usepackage[ansinew]{inputenc} % latin1 includes "\"a,\"o,\"u", ansinew includes win32 specials
\usepackage[T1]{fontenc}       % enable EC-Fonts (extended cork)
\usepackage{lmodern}
\usepackage{amsmath}           % provides a lot math stuff, i.a. subarry
```

Notice: `\usepackage{exscale}` is not needed.

Zero-dimensional Multi-domain Simulation

The model is based on a *zero-dimentional* or *one equation mode* and needs an engineering software, e.g. AspenPlus, to calculate the physical properties. But as long as no optimization of the flow field is wanted, the loss of information is small. Hence, the core functional layers ADL, ACL, PEM, CCL and CDL are relatively thin ($l < 3\text{E-}4\text{ m}$). If the flowfield design should be optimized, the model can be extended to a pseudo three dimentional model by subdividing the cell in small segments. Each segment is a micro cell and all cells are connected via the diffusion layers to the flow fields and can exchange flows at the cell boarders to the next neighbors. The main drawbag of this approach inside an engineering software as AspenPlus, Proll, HYSYS, etc. is, that these programs are not prepared to work in a way CFD software does. On the other side, CFD software is not well equiped to perform difficult property calculations.

$\mathbf{\hat{C}}$:
CCCC

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\[
\mathbf{B}(P)=\frac{\mu_0}{4\pi}\int\frac{\mathbf{I}\times\hat{r}}{r^2}dl=
\frac{\mu_0}{4\pi}\int\frac{d\mathbf{l}\times\hat{r}}{r^2}
\]
```

$$\mathbf{B}(P) = \frac{\mu_0}{4\pi} \int \frac{\mathbf{I} \times \hat{r}'}{r'^2} dl = \frac{\mu_0}{4\pi} I \int \frac{dl \times \hat{r}'}{r'^2}$$