Surface Integral

For a scalar function f over a surface parameterized by u and v, the surface is given by

$$
\begin{aligned}
\Phi &= \int_s f \mathrm{d}a && (1.1)\\
&= \int_s (u,v) \mid \mathbf{T}_u \times \mathbf{T}_v \mid \mathrm{d}u\mathrm{d}v && (1.2)
\end{aligned}
$$

. where $\mathbf{T}_u$ and $\mathbf{T}_v$ are tangent vectors and is the cross product. For a vector functions over a surface, the surface integral is given by

$$
\begin{aligned}
\Phi &= \int_s \mathbf{f} \cdot \mathrm{d}\mathbf{a} && (1.3)\\
&= \int_s (\mathbf{F} \cdot \hat{\mathbf{n}}) \mathrm{d}a && (1.4)\\
&= \int_s f_x \mathrm{d}y \mathrm{d}z + f_y \mathrm{d}z \mathrm{d}x + f_z \mathrm{d}x \mathrm{d}y && (1.5)
\end{aligned}
$$

. where $\mathbf{a} \cdot \mathbf{b}$ is a dot product and $\hat{\mathbf{n}}$ is a unit normal vector. If $z = f(x, y)$, the d$\mathbf{a}$ is given explicitly by

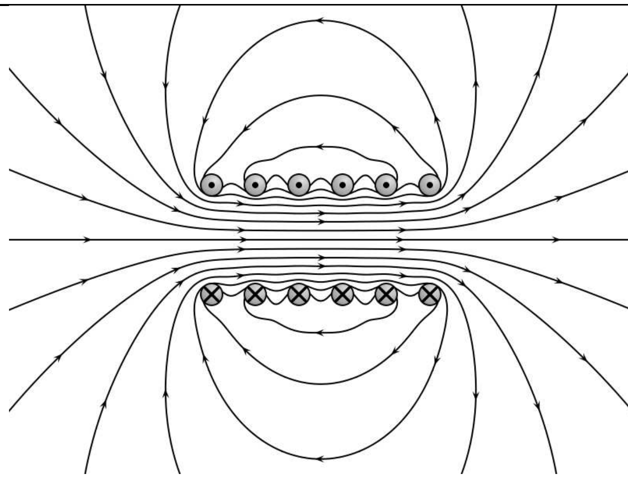
$$
d\mathbf{a} = \pm(-\frac{\partial z}{\partial x}\hat{x} - \frac{\partial z}{\partial y}\hat{y} + \hat{z})\mathrm{d}x\mathrm{d}y \qquad (1.6)
$$

. If the surface is *surface parameterized* using u and v, then

$$
\Phi = \int_s \mathbf{F} \cdot (\mathbf{T}_u \times \mathbf{T}_v) \mathrm{d}u\mathrm{d}v \qquad (1.7)
$$

.

Maxwells's Equations



Integral form

$$\oiint_{\partial\Omega} \mathbf{E} \cdot \mathrm{d}\mathbf{S} = \frac{1}{\varepsilon_0} \iiint_{\Omega} p \mathrm{d}V \quad (2.1)$$

$$\oiint_{\partial\Omega} \mathbf{B} \cdot \mathrm{d}\mathbf{S} = 0 \quad (2.2)$$

$$\oint_{\partial\Sigma} \mathbf{E} \cdot \mathrm{d}\ell = -\frac{d}{dt} \iint_{\Sigma} \mathbf{B} \cdot \mathrm{d}\mathbf{S} \quad (2.3)$$

$$\oint_{\partial\Sigma} \mathbf{B} \cdot \mathrm{d}\ell = \mu_0 \iint_{\Sigma} (\mathbf{J} + \varepsilon_0 \frac{\partial \mathbf{E}}{\partial t}) \cdot \mathrm{d}\mathbf{S} \quad (2.4)$$

.

Differential form

$$\nabla \cdot \mathbf{E} = \frac{p}{\varepsilon_0} \quad (2.5)$$

$$\nabla \cdot \mathbf{B} = 0 \quad (2.6)$$

$$\nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t} \quad (2.7)$$

$$\nabla \times \mathbf{B} = \mu_0 (\mathbf{J} + \varepsilon_0 \frac{\partial \mathbf{E}}{\partial t}) \quad (2.8)$$

.

Grading Policies

1. All project must be submitted electronically by 23:59:59 on the due date via TEACH use ”Check time on server” if unsure about your clock. TEACH time takes priority over your local computer.
2. Only a single late homework assignment allowed. Only allowed up to 7 calendar days late.
3. Submit late homework to your assigned TA via email.
4. Blatant disrespect to or by the TAs will not be tolerated.
5. If you do not demo your project, you do not receive credit for it.
6. When you make an appointment to demo, show up. Failure to show up will result in a grade penalty. Repeated offenses will result in no credit for the assignment.
7. If your project does not compile, for any reason, no credit will be given.
8. Compilation will be on os-class. This server is the nal say on whether your code compiles.
9. No directories in you submissions. You will be penalized for including any sort of hierarchy.
10. All assignments submitted to TEACH. No late submissions will be accepted via TEACH.
11. Naming convention: CS311_proj⟨x⟩_⟨engr_username⟩.tar.bz2. Fill ⟨⟩in with appropriate values.
12. No zip les will be accepted. You must use bzipped tar les.
13. All non-code documents must be created with LaTeX, by hand. This will be discussed in class.
14. All work must be done individually unless specically allowed to work in groups.

Learning Objectives

- Explain why multiprogramming is important for modern operating systems.
- Explain the general structure of a multiprogrammed operating system.
- Explain the purpose and operation of system calls.
- Write a program utilizing system calls.
- Write a program using a scripting language.
- Write a program that uses regular expressions to parse input data.
- Write a program that spawns processes and provides mutual exclusion for variables or other resources shared by the processes.
- Write a program that uses sockets to implement a client/server system.
- Explain how a common le system works, including structure, I/O operations, and security.
- Describe the memory organization of a typical process in a common operating system.