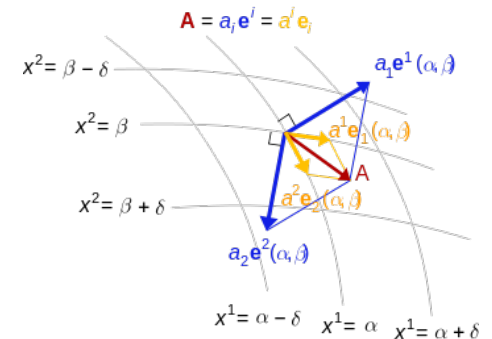
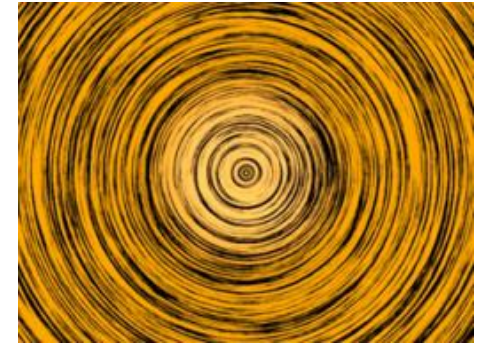
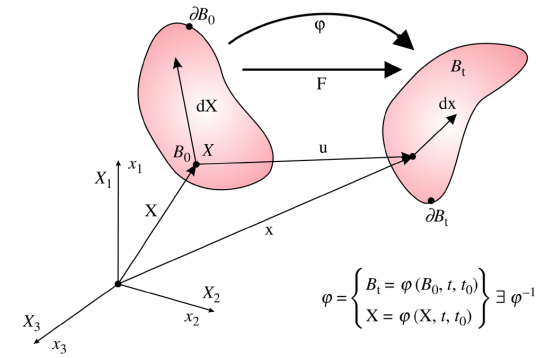


MAT 423 Vector and Tensor Calculus

MW 12:00 - 1:50 pm, Fall 2014

Vector and Tensor Calculus is a fundamental area of mathematics, and is used extensively in science, engineering, and technology. The methods developed in this course include: the gradient, curl, and divergence, the del operator in general curvilinear coordinates, covariant differentiation, line integrals, surface integrals, Gauss' theorem, Stokes' theorem, Green's theorem and the divergence theorem. Selected applications will be included from fluid and continuum mechanics.

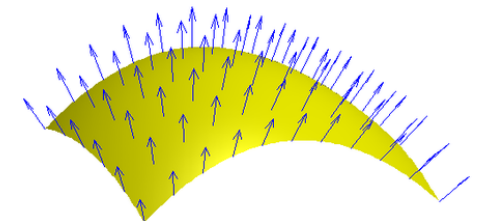
Prerequisite: MAT 253 (Calculus III) or equivalent.



$$\oint_{\partial D} P dx + Q dy = \iint_D \left(\frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y} \right) dA. \quad \text{Green}$$

$$\int_C \mathbf{F} \cdot d\mathbf{r} = \iint_S (\text{curl } \mathbf{F}) \cdot d\mathbf{S}. \quad \text{Stokes}$$

$$\iint_S \mathbf{F} \cdot d\mathbf{S} = \iiint_E \text{div } \mathbf{F} dV. \quad \text{Gauss}$$



Div Green Index notation Stress Tensor
Differential Geometry Manifolds Balance Equations
Gauss Stokes Shells Christoffel Symbols Elasticity Fluids
Grad Vector & Tensor Calculus
Curl Continuum Mechanics Navier Stokes Equation
Materials Curvilinear Coordinates Electromagnetism Metric Tensor

Feel free to email Andrea Dziubek, dziubea@sunyit.edu