

Scalar functions on \mathbb{R}^3 $\xrightarrow{\nabla}$ Vector fields on \mathbb{R}^3 $\xrightarrow{\text{curl}}$ Vector fields on \mathbb{R}^3 $\xrightarrow{\text{div}}$ Scalar functions on \mathbb{R}^3

FT line integrals

Stokes' Thm

Div Thm

$$\int_C \nabla \varphi \cdot dr = \varphi(B) - \varphi(A)$$

$$\int_S F \cdot dr = \iint_S \text{curl } F \cdot dn$$

$$\iiint_E F \cdot du = \iint_E \text{div } F \cdot dV$$

signed points

oriented curves

oriented surfaces

Solid regions

$A \rightarrow B$

α

α

α

ex evaluation at points

ex

line integral

ex surface integral

ex

triple integral

$$\varphi(B) - \varphi(A)$$

$$\int_C f dx + g dy + h dz$$

$$\iint_S F \cdot dn$$

$$\iiint_E F \cdot dV$$

$$\text{curl}(\nabla \varphi) = 0, \text{div}(\text{curl } F) = 0.$$

A very brief summary of vector calc in \mathbb{R}^3