

Multi Variable Calculus

Complete Notes and Transcript

Aaron Lengyel

Abstract

This is a combination of all of my understandings and findings in regards to multivariable calculus. The explanations are mine, and these are meant to act as transcripts for the video series on analysis I will be producing. This covers everything from the basics to more advanced concepts near the end. There aren't any exercises, only examples and solutions. A **ton** is going to be covered in this series so don't be surprised if you do not capture or understand it all during one sitting. This is meant to be a small part of a vast comprehensive resource of a analysis. There *will* be mistakes (which I hope to rectify along the way).

Introduction

Functions in Multiple Variables

Outcomes

History

Contents

Introduction	1
Functions in Multiple Variables	1
Outcomes	1
History	1
Partial Differentiation	2
Generalized Chain Rule	2
Different Coordinate Systems	2
Cartesian	2
Polar	2
Cylindrical	2
Spherical	2
Multiple Integration	3
Double Integrals	3
Triple Integrals	3
Polar Integrals	3
Applications of Integration	3
Volume Integrals	3
Surface Area	3
.	3
Vector Calculus	3
Connection between Calculus and Linear Algebra . . .	3
Vector and Scalar Fields	3
Vector Valued Functions	3
Conservative Functions	3
Divergence	3
Curl	3
Jacobian	3
Jacobian Matrix	3
Jacobian Determinant	3

Partial Differentiation

Generalized Chain Rule

Different Coordinate Systems

Cartesian

Polar

Cylindrical

Spherical

Multiple Integration

Double Integrals

Triple Integrals

Polar Integrals

Applications of Integration

Volume Integrals

Surface Area

Vector Calculus

Connection between Calculus and Linear Algebra

Vector and Scalar Fields

Vector Valued Functions

Conservative Functions

Divergence

Curl

Jacobian

Jacobian Matrix

Jacobian Determinant