Regression

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1 Introduction

These notes will contain a breif overview of the following topics:

- Linear Regression
- Locally Weighted Regression
- Logistic Regression

Regression

2 Key Concepts

2.1 Definition and Theorems

Definition 2.1 (Limit of a Sequence)**.** *Let $\{a_n\}$ be a sequence of real numbers. We say that a_n converges to $L \in \mathbb{R}$ if for every $\epsilon > 0$, there exists an $N \in \mathbb{N}$ such that for all $n > N$, $|a_n - L| < \epsilon$.*

Theorem 2.2 (Fundamental Theorem of Algebra)**.** *Every non-constant polynomial with complex coefficients has at least one complex root.*

2.2 Examples and Applications

Example 2.3. *Consider the sequence $\{a_n\} = \frac{1}{n}$. This sequence converges to 0 as n approaches infinity.*

2.3 Notes and Remarks

Remark 2.4. *The Fundamental Theorem of Algebra implies that a polynomial of degree n has exactly n roots in the complex plane, counting multiplicities.*

3 Advanced Topics

3.1 Differential Equations

- Introduction to differential equations.
- First-order differential equations.
  - Separable equations.
  - Linear equations.
- Higher-order differential equations.

3.2 Linear Algebra

- Vector spaces.
- Linear transformations.
- Eigenvalues and eigenvectors.
  - Definition and properties.
  - Applications in solving systems of linear equations.

4 Conclusion

- Summary of the main points.
- Potential areas for further study.