

Lecture 2: Concentration without Independence

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1 Martingale-based Methods

1.1 Martingale

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1.2 Concentration Inequalities for Martingale Difference Sequences

1.2.1 Azuma-Hoeffding Inequality

1.2.2 McDiarmid's Inequality

1.2.3 Applications

2 The Efron-Stein Inequality

2.1 Bounding Variance

2.2 Functions with Bounded Differences

2.3 Self-Bounding Functions

2.4 A Proof of the EfronStein Inequality Based on Duality