

# Preface

In this monograph we present univariate and multivariate probabilistic inequalities regarding basic probabilistic entities like expectation, variance, moment generating function and covariance. These are built on recent classical form real analysis inequalities also given here in full details. This treatise relies on author's last twenty one years related research work, more precisely see [18]-[90], and it is a natural outgrowth of it. Chapters are self-contained and several advanced courses can be taught out of this book. Extensive background and motivations are given per chapter. A very extensive list of references is given at the end. The topics covered are very diverse. Initially we present probabilistic Ostrowski type inequalities, other various related ones, and Grothendieck type probabilistic inequalities. A great bulk of the book is about Information theory inequalities, regarding the Csiszar's  $f$ -Divergence between probability measures. Another great bulk of the book is regarding applications in various directions of Geometry Moment Theory, in particular to estimate the rate of weak convergence of probability measures to the unit measure, to maximize profits in the stock market, to estimating the difference of integral means, and applications to political science in electoral systems. Also we develop Grüss type and Chebyshev-Grüss type inequalities for Stieltjes integrals and show their applications to probability. Our results are optimal or close to optimal. We end with important real analysis methods with potential applications to stochastic. The exposed theory is destined to find applications to all applied sciences and related subjects, furthermore has its own theoretical merit and interest from the point of view of Inequalities in Pure Mathematics. As such is suitable for researchers, graduate students, and seminars of the above subjects, also to be in all science libraries.

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