

In this thesis we deal with a correlation inequality for Gaussian random variables called Gebelein's inequality. In the first part of the thesis, we state the inequality, define Hermite polynomials, and derive several of their properties which we then use to prove the inequality. In the second part, we apply Gebelein's inequality in order to show that for normalized Gaussian sequences the Borel-Cantelli lemma and strong law of large numbers still hold when the assumption of independence is replaced by a sufficient fast decay of their correlation function.