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Engineer inflation in realistic string compactifications

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Abstract content
   (Max 300 words)
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We study slow roll inflation and invoke results from random algebraic geometry to construct a way of generating a variety of inflationary potentials, and then scan through these potentials to identify how many satisfy slow roll conditions. This is essentially done by searching for minimas in a polynomial based potential and then testing the slow-roll conditions. Based on the results of the analysis, we then want to be able to say something about the distribution of polynomials that give rise to inflation, and, if there are certain polynomial potentials (both of single and multifields) which favor slow-roll more than other polynomial potentials. Since we also want to engineer potentials in the context of particular Calabi-Yau compactifications, we need to not only scan for potentials but also infer properties of these compactifications by characterizing them. To do this we investigate the characterization of Calabi-Yau compactifications. This csn be done by characterization of the reflexive polytopes which are used to obtain Calabi-Yau geometries. To do this, we can look at how many Calabi-Yau geometries have a given set of $(h^{1,1}+h^{1,2}, h^{1,1}-h^{1,2})$. The weighting of the number of reflexive polytopes for different values of $h^{1,1}$(number of K\"ahler moduli) and $h^{1,2}$(number of complex moduli) is given by the Kreuzer-Skarke database. It is from this database where we study the distribution of $h^{1,1}$ and $h^{1,2}$. Since it is a very rich database, we propose an initial statistical approach by making use of various data analysis techniques of the distributions of $h^{1,1}+h^{1,2}$ and $h^{1,1}-h^{1,2}$.

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