1154-11-794 **Naser Talebizadeh Sardari*** (nasertalebi1367@gmail.com). *Complexity of strong approximation on the sphere.*

By assuming some widely-believed arithmetic conjectures, we show that the task of accepting a number that is representable as a sum of $d \geq 2$ squares subjected to given congruence conditions is NP-complete. On the other hand, we develop and implement a deterministic polynomial-time algorithm that represents a number as a sum of 4 squares with some restricted congruence conditions, by assuming a polynomial-time algorithm for factoring integers and Conjecture **??**. As an application, we develop and implement a deterministic polynomial-time algorithm for navigating LPS Ramanujan graphs, under the same assumptions. (Received September 10, 2019)