

1105-58-9

Saman Moradian Jahoudbejari* (saman_com69@yahoo.com), Shahed alley, Janbazan street, 4351846443 Fouman, Guilan, Iran. *Numerical Analysis and Partial Differential Equations*. Preliminary report.

We study two quite different approaches to understanding the complexity of fundamental problems in numerical analysis. We show that both hinge on the question of understanding the complexity of the following problem, which we call PosSLP: Given a divisionfree straight-line program producing an integer N , decide whether $N > 0$. We show that PosSLP lies in the counting hierarchy, and we show that if A is any language in the Boolean part of PR accepted by a machine whose machine constants are algebraic real numbers, then $A \in \text{PPosSLP}$. Combining our results with work of Tiwari, we show that the Euclidean Traveling Salesman Problem lies in the counting hierarchy – the previous best upper bound for this important problem (in terms of classical complexity classes) being PSPACE (Received May 04, 2014)