

Efficient matrix multiplication

Joseph Landsberg

In 1968 V. Strassen set out to prove the usual algorithm we use to multiply matrices is the best possible. He failed, inspiring a tremendous amount of work attempting to determine just how efficiently matrices may be multiplied. It is now conjectured that as the sizes of the matrices grow, it becomes almost as easy to multiply matrices as it is to add them. I will give a history of and discuss recent exciting developments on this central question. The story will take us through many areas of mathematics, all of which connect to linear algebra: tensors, probability, information theory, representation theory and algebraic geometry.