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**Brett Barwick\*** ([barwicjb@mailbox.sc.edu](mailto:barwicjb@mailbox.sc.edu)). *An Algorithmic Approach to the Quillen-Suslin Theorem over  $\mathbb{Z}[x_1, \dots, x_n]$* . Preliminary report.

In 1976 D. Quillen and A. Suslin independently proved what is now called the Quillen-Suslin Theorem, resolving a famous question posed by J.P. Serre in 1955. The Quillen-Suslin Theorem asserts that every finitely generated projective module  $P$  over  $k[x_1, \dots, x_n]$ , with  $k$  a field, is free. One can extend this result to any polynomial ring where the coefficient ring is a principal ideal domain, and so in particular it holds over  $\mathbb{Z}[x_1, \dots, x_n]$ . However, given a presentation of a finitely generated projective  $\mathbb{Z}[x_1, \dots, x_n]$ -module by generators and relations it is a nontrivial task to compute a free generating set. The problem of computing such a free generating set is equivalent to the problem of extending an  $m \times n$  ( $m \leq n$ ) unimodular matrix over  $\mathbb{Z}[x_1, \dots, x_n]$  to an  $n \times n$  invertible matrix over  $\mathbb{Z}[x_1, \dots, x_n]$ . This talk aims to give a brief overview of an algorithm presented by Logar-Sturmfels in 1992 which produces such an invertible matrix when the coefficient ring is a field, as well as some issues that arise in generalizing this algorithm to work over the integers. (Received January 20, 2011)