Abstract

Symbolic integration is the problem of nding a \closed form" expression for an indefinite integral. This problem attracted many mathematicians but the rst substantial contribution came from Joseph Liouville (1840). In crude terms, he proved that if analgebraic function has an elementary integral then the latter is itself an algebraic function plus a sum of constant multiples of logarithms. Later, Maxwell Rosenlicht ([1],[2]) provided a purely algebraic exposition of the problem and proved this theorem of Liouville using algebraic techniques. Another serious contribution to the problem of Symbolic integration was made by Robert Risch. In his paper ([3]), building on the work of Rosenlicht, Risch produced an algorithm to determine when an indenite integral has a nite closed form expression. In this thesis, I will elaborate the works of Rosenlicht and Risch on the theory of integration in nite terms.