Abstract

In Chapter 1, there are given some necessary definitions and results about monomial orderings, Standard basis and Sagbi basis in polynomial ring over the field along with a description on the Gröbner walk algorithm and Gröbner basis under composition.

In Chapter 2 we develop a theory of subalgebra basis analogous to Standard basis for ideals in polynomial rings over a field. We call this basis **Sasbi Basis**, standing for Subalgebra Analogue to Standard Basis for Ideals. Sasbi bases may be infinite. In this chapter we consider subalgebras admitting a finite Sasbi basis and give algorithms to compute them. Sasbi basis theory is given in my paper [22].

In Chapter 3, we present an algorithm which converts the Sagbi basis with respect to one ordering to the Sagbi basis with respect to another ordering, under the assumption that the subalgebra admits a finite Sagbi basis with respect to all monomial orderings. We called it **Sagbi walk** algorithm. Sagbi Walk algorithm is given in my paper [20].

Composition is an operation of replacing variables in a polynomial by other polynomials. In Chapter 4, we study the behavior of Sagbi basis under composition. Some related results are from my paper [21].