

ABSTRACT

In the first chapter some basic notions and results from commutative algebra are being introduced.

In the second chapter we present new results related to sequentially Cohen-Macaulay, pretty clean and Stanley ideals. Let I be a monomial ideal of the polynomial ring $S = K[x_1, \dots, x_4]$ over a field K . We show that S/I is sequentially Cohen-Macaulay if and only if S/I is pretty clean. In particular, if S/I is sequentially Cohen-Macaulay then I is a Stanley ideal.

Chapter 3 includes some results related to Stanley Conjecture. We define nice partition of the multicomplex associated to a Stanley ideal. In the main result we show that if the multicomplex associated to monomial ideal I has a nice partition then the multicomplex associated to polarized ideal I^p has a nice partition.

Fourth and last chapter deals with the regularity of ideals of Borel type. We have proved that the regularity of monomial ideals whose associated prime ideals are totally ordered by inclusion is linearly bounded.