INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Thesis Title:
Local properties of Richardson varieties in symplectic and orthogonal Grassmannians

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SHORT ABSTRACT

In a paper by Kodiyalam and Raghavan, they provided an explicit combinatorial description of the Hilbert function of the tangent cone at any point on a Schubert variety in the Grassmannian, by giving a certain "degree-preserving" bijection between a set of monomials defined by an initial ideal and a "standard monomial basis". In this thesis, we have proved that this bijection is in fact a bounded RSK correspondence. As an application, we have proved that the bijection given in a paper of Ghorpade and Raghavan (for the symplectic Grassmannian) is also a bounded RSK correspondence. In the PhD thesis of Kreiman, he had given a bijection between the same two combinatorially defined sets as in the paper of Kodiyalam and Raghavan. In this thesis, we have proved that the bijection given in Kreiman's thesis and the bijection given in the paper of Kodiyalam and Raghavan are equivalent. Using the above results, we have given an explicit Gröbner basis for the ideal of the tangent cone at any T -fixed point of a Richardson variety in the symplectic Grassmannian. In this thesis, we have also provided formulae for the multiplicity at any T -fixed point of a Richardson variety in the symplectic as well as the orthogonal Grassmannians; together with an interpretation of the multiplicity in terms of certain non-intersecting lattice paths.