Name-Surname	**Athanasios Smponias**
Thesis Title	*Quantum correlations of two interacting particles in a 1D box with hard walls*
Supervisor	F. Diakonos, Associate Professor
Summary	In this thesis we have studied a system of two bosons, confined in an one dimensional hard wall box, with repulsive point- interactions. Firstly we have analytically obtained the eigenstates of the Hamiltonian. Then we have studied the change in the behavior of the ground and first excited state of the system varying the interaction strength between the particles. This led to the observation of the fermionization of the system in the Tonks-Girardeau limit (infinite strength). In addition we have analytically defined the reduced density matrix of the system and studied its behavior for different values of the interaction parameter. Finally we have calculated the one particle momentum distribution and we developed a scheme for the semi-analytical calculation of the von Neumann entropy using the one-particle "natural orbitals".
Key words	Open quantum systems, Fermionization, Reduced Density Martix, von Neumann entropy.
Evaluation committee	F. Diakonos, Associate Professor A.Karanikas, Associate Professor D. Frantzeskakis, Professor