Name-Surname	Konstantinos Kaklamanis
Thesis Title	*Monte Carlo simulations of the classical Heisenberg ferromagnet in lattices of cubic symmetry*
Supervisor	C. Simserides, Assistant Professor
Summary	In this thesis the continuous phase transition of the classical O(3) Heisenberg ferromagnet was studied in sc, bcc and fcc lattices. Since no analytical solution is available in three dimensions for this model, the critical behavior was studied: I. Qualitatively, via numerical calculations of the self consistent equation for the magnetization and other important thermodynamic quantities, in the context of the mean field approximation. II. Quantitatively, by making use of Monte Carlo simulations, the finite size scaling theory and the single histogram reweighting method. The critical exponents ν and γ were calculated by studying the scaling properties of various thermodynamic quantities from simulations covering the critical region of each lattice type. The critical temperature was estimated via the cumulant crossing method and the scaling properties of pseudocritical transition points of various thermodynamic quantities. Moreover, in the case of sc lattice, the critical exponent β was determined from the scaling behavior of magnetization per spin in the estimated critical point. The other critical exponents were extracted indirectly, by means of scaling laws for each lattice type. Both the results for the estimated transition points and the critical exponents, are in good agreement with other Monte Carlo studies and series expansion methods with respect to the calculated errors. Furthermore, the values of critical exponents for sc, bcc and fcc lattices agree with each other, which verifies the universal aspects of critical behavior.
Key words	Monte Carlo, finite size scaling, Heisenberg model, critical exponents, cubic lattices
Evaluation committee	C. Simserides, Assistant Professor S. Gardelis, Associate Professor S. Glenis, Assistant Professor