The College of Graduate Studies and the College of Science Cordially Invite You to a

Master Thesis Defense

Entitled

GROUND STATES OF GIBBS MEASURES ON λ MODEL ON CAYLEY TREE OF ORDER TWO

by

Rauda Humaid Buti Saeed Alshamsi

Faculty Advisor

Prof. Farrukh Mukhamedov, Department of Mathematics

College of Science

Date & Venue

11:00 AM

Thursday, 16 April 2020

Abstract

It is known that statistical mechanics is interested with the average properties of a mechanical system. Some examples are like the water in a kettle, the atmosphere inside a room and the number of atoms in a magnet bar. These kinds of systems are made up of a large number of components, usually molecules. The observer has restricted power to consider all the component. All we can do is to specify a few average quantity of the system such as its density, pressure or temperature. The main objective of statistical mechanics is to predict the relation between the observable macroscopic properties of the system, given only a knowledge of the microscopic interactions between the components. The present thesis is devoted to a model whose interacting molecules are located on nearest neighbor vertices of a Cayley tree. In this thesis, we investigate ground states and Gibbs measures of λ -model on a Cayley tree of order two. This investigation is closely related to the phase transitions phenomenon for lattice models on trees. We consider the model where spin have only three values. For this kind of model, we are going to describe all its ground states and study phase transition phenomena by means of Gibbs measures.

Keywords: Cayley tree, Gibbs measures, statistical mechanics.