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PUNTIP TOGHAW : AN EIGENVALUE PROBLEM FOR A LARGE SPARSE SKEW SYMMETRIC MATRIX : JULIAN POULTER, Ph.D., BENCHAWAN WIWATANAPATAPHEE, Ph.D. 94 P. ISBN 974-664-634-6

The purpose of this study is to calculate all eigenvalues of a large sparse skew symmetric matrix with size up to 35908 elements and then use these eigenvalues for calculation of the thermodynamic quantities related to the frustration of the Ising spin glass on the triangular lattice with a high concentration of negative bonds.

In this thesis, we studied two numerical techniques for solving the eigenvalue problem, the Given's method and the block Lanczos method, which are appropriate with abovementioned sparse matrices. We developed numerical algorithms based on Given's method and the block Lanczos method to calculate the thermodynamic quantities at a high concentration of negative bonds especially with concentrations greater than or equal to 80%. We compared both methods in different ways and we conclude that the Given's method is more appropriate than the block Lanczos method. The result indicates that the developed algorithm based on Given's method is robust. The entropy data with a concentration of negative bonds equal to 100% and a range of values of lattice size up to 192 can be approximated by an excellent linear fit.