1077-82-1752 **Grethe Hystad*** (`ghystad@math.arizona.edu`), Department of Mathematics, The University of Arizona, 617 N. Santa Rita Ave. P.O. Box 210089, Tucson, AZ 85719. *Periodic Ising model and Ising Correlations.*

The Ising model, which is one of the most studied models in modern physics, has had great success in shedding light on the existence of phase transitions at a finite temperature (critical temperature). The simplicity of the model made it possible to obtain exact mathematical results in the thermodynamic limit of statistical mechanics. In this talk we will compute the spin correlation functions for the finite 2-D periodic Ising model. We will show how this problem can be reduced to a representation theoretic problem associated with the orthogonal group. The correlation functions on the cylinder and the torus can be evaluated in terms of spin matrix elements in an orthonormal basis of eigenvectors for the transfer matrix. The representation of the spin matrix elements is obtained by considering the spin operator as an intertwining map. (Received September 20, 2011)