1145-82-84 **Assane Lo*** (assanelo@uowdubai.ac.ae), University of Wollongong in Dubai, Block 15, Knowledge Park, PO Box 20183, Dubai, UAE, Dubai, United Arab Emirates. *Direct Methods for Investigating Phase Transitions in Classical Models of Kac Type.*

Phase transitions and critical points correspond to mathematical singularities in the thermodynamic potentials and other thermodynamic quantities which are related to appropriate derivatives of the free energy. For example, at the critical point of a ferromagnetic system, the spontaneous magnetization vanishes and the susceptibility diverges. It is therefore central to develop methods for calculating the thermodynamic potentials and their derivatives. We consider classical continuous models of Kac type and discuss hypotheses on the source term that will result in a direct proof of the analyticity of the free energy without using the truncated correlations. (Received July 25, 2018)