MTH Seminar

Mean field equation and Toda system

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In this talk, we consider the background and recent works for Toda system of mean field type. Toda system appears in many other problems which arise in geometry and physics. If Toda system is reduced to the single equation, that is, mean field equation, it is related to the Nirenberg problem of finding the prescribing Gaussian curvature if the set of singularities is empty, and the existence of a positive constant curvature metric with conic singularities if the set of singularities is non-empty. Moreover, we can also find general Toda system in the gauge theory in many physics models. For example, to describe the physics of high critical temperature superconductivity, a model of relative Chern-Simons model was proposed and this model can be reduced to a n-coupled system with exponential nonlinearity if the gauge potential and the Higgs field are algebraically restricted. Then Toda system is one of the limiting equations if the coupling constant tends to zero. We will review the developments of Toda system and mean field equation and introduce some open problems.