

## Dynamics of Neural Networks and Their Applications

**Abstract:** In this talk, first some stability criteria for neural networks will be discussed. Then a couple applications of neural networks will be presented. A. Portfolio-optimization problem in financial market. Since the objective function in the portfolio optimization is nonconvex, it is naturally challenging for designing a recurrent neural network to get its optimal solutions. However, due to the pseudoconvexity of the objective function on the feasible region, a recurrent neural network with convergence is presented for portfolio optimization to ensure the optimal solutions for portfolio optimization. B. Variational inequalities (VIs) and related optimization problems. Projection neural network (PNN) is proposed for solving monotone variational inequalities (VIs) and related optimization problems. Considering the inertial term into first order PNNs, an inertial PNN (IPNN) is also proposed for solving VIs. Under certain conditions, the IPNN is proved to be stable, and can be applied to solve a broader class of constrained optimization problems related to VIs. This is more convenient for exploring different Karush-Kuhn-Tucker optimal solution for nonconvex optimization problems.