A NEURAL NETWORK MODEL FOR INVERSE QUASI-VARIATIONAL INEQUALITIES

Soumitra Dey
Post-Doctoral Research Fellow
The Technion-Israel Institute of Technology, Haifa, 3200003, Israel
Email: deysoumitra2012@gmail.com

Abstract. The inverse variational inequality problem (IVIP) received attention by many researchers due to applications in various fields such as traffic network problems and economic equilibrium problems. Later on, it was generalized in various directions. One of the most important generalizations is known as the inverse quasi-variational inequality problem (IQVIP). There are several analytical approaches to solving IVIP and IQVIP. However, the number of numerical algorithms for solving them is very limited. Recently, neural network approaches to solving many optimization problems such as variational inequality, monotone inclusion, and inverse variational problems have attracted considerable interest. In this talk I intend to speak on the existence and uniqueness of solutions to inverse quasi-variational inequality problems. Also, motivated by the neural network approach to the IVIP, I introduce a neural network for inverse quasi-variational inequalities. I intend to discuss the existence and uniqueness of a solution to the network. I will show that every trajectory of the proposed network converges to the unique solution to the inverse quasi-variational inequality problem and that the network is globally asymptotically stable at the equilibrium point. I will prove that if the function which governs the IQVIP is strongly monotone and Lipschitz continuous, then the network is globally exponentially stable at the equilibrium point. I also intend to show that algorithm generated by the discretization of the network converges strongly to a solution of the IQVIP under certain assumptions on the parameters involved. Finally, the obtained results will be illustrated by numerical examples.