

Calderon -Zygmund Analysis Seminar

Monday, March 2, 2020, 3:45 pm, Eck 202

The dynamics of kink-antikink pairs for scalar fields on the line

Andrew Lawrie (MIT)

Abstract. We will discuss classical nonlinear scalar field models on the real line. If the potential is a symmetric double-well, such models admit static solutions called kinks and antikinks, which are perhaps the simplest examples of topological solitons. We study pure multi-kinks, which are solutions that converge in one infinite time direction to a superposition of a finite number of kinks and antikinks, without radiation. Our main result is a complete classification of all kink-antikink pairs in the strongly interacting regime, which means the speeds of the kinks tend asymptotically to zero. We show that up to translation there is only one such solution, and we give a precise description of the dynamics of the kink separation. We also establish the existence of strongly interacting K -kinks clusters, for any natural number K . This is joint work with Jacek Jendrej (Paris 13 and CNRS) and Michal Kowalczyk (U. Chile).