

Abstract

In my talk, I will introduce integrable peakon and cuspon equations and present a basic approach how to get peakon solutions. Those equations include the well-known Camassa-Holm (CH), the Degasperis-Procesi (DP), and other new peakon equations. I take the CH case as a typical example to explain the details. My presentation is based on my previous work (Communications in Mathematical Physics 239, 309-341). I will show that the Camassa-Holm (CH) spectral problem yields two different integrable hierarchies of nonlinear evolution equations (NLEEs), one is of negative order CH hierarchy while the other one is of positive order CH hierarchy. The two CH hierarchies possess the zero curvature representations through solving a key matrix equation. We see that the well-known CH equation is included in the negative order CH hierarchy while the Dym type equation is included in the positive order CH hierarchy. In particular, the CH peakon equation is extended to the FORQ/MCH and other higher order peakon models with peakon and weak-kink solutions. In the end of my talk, some open problems are also addressed for discussion.