



Classification of Rogue Wave Solutions of the Nonlinear Schroedinger Equation

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The so-called homoclinic solutions of the nonlinear Schroedinger (NLS) equation are the most commonly used unstable wave packets that are associated with the rogue wave phenomena. Indeed the solutions due to Akhmediev, Peregrine and Ma-Kuznetsov are almost exclusively used in scientific and engineering applications. However, there are an infinite number of solutions to the NLS equation that are not classifiable as homoclinic solutions. My talk will be based upon the fact that the genus- N theta function solutions of the NLS equation are the most general for periodic boundary conditions. In this way, I am able to separate and identify many classes of solutions of the NLS equation. I will describe how all homoclinic solutions of the NLS equation can be derived from the theta functions. Furthermore, I also identify all other solutions of the equation that are of course not homoclinic.