

NEW INSIGHTS INTO SINGULARITY ANALYSIS

AMLAN HALDER¹, Andronikos Paliathanasis², and P Leach³

¹Pondicherry University

²Durban University of Technology

³University of KwaZulu-Natal

April 28, 2020

Abstract

In this work we emphasise the use of singularity analysis in obtaining analytic solutions for equations for which standard Lie point symmetry analysis fails to make any lucid decision. We study the higher-dimensional Kadomtsev-Petviashvili, Boussinesq and Kaup-Kupershmidt Equations in a more general sense. With higher-order equations there can be a commensurate number of resonances and, when consistency for the full equation is examined, at each resonance the constant of integration is supposed to vanish from the expression so that it remains arbitrary, but if there is an instance of this not happening, the consistency can be partially established by giving the offending constant the value from the defining equation. If consistency is otherwise not compromised, the equation can be said to be partially integrable, ie, integrable on a surface of the complex space. Furthermore we propose an approach which is meant to magnify the scope of singularity analysis for equations admitting higher values for resonances or positive leading-order exponent.

Hosted file

KP 34.pdf available at <https://authorea.com/users/308978/articles/439995-new-insights-into-singularity-analysis>