

# Stokes' phenomenon arising from colliding poles in the confluence from $P_{VI}$ to $P_V$

Calum Horrobin  
Supervised by Professor Marta Mazzocco

Geometry and Mathematical Physics Research Group, Loughborough University, UK

## **Abstract**

In this talk I will explain how the Stokes' phenomenon arises from colliding poles in the confluence of the auxiliary linear system of the Painlevé equation  $P_{VI}$  to the one of  $P_V$ . I will begin by briefly reviewing Fuchsian singular points of linear ODEs, irregular singular points of Poincaré rank one and the corresponding Stokes' phenomenon, all under the framework of the  $P_{VI}$  and  $P_V$  linear systems. A confluence procedure between these two systems will be analysed and, while staying near the colliding poles, I will present a method to understand how the Stokes' phenomenon arises; this uses the asymptotic expansion of the true solutions of the confluent equation and a certain existence theorem of Glutsyuk. In particular, we are able to compute the Stokes' matrices of the confluent equation in terms of the connection matrices of the original equation.