



# UCL Undergraduate Mathematics Colloquium

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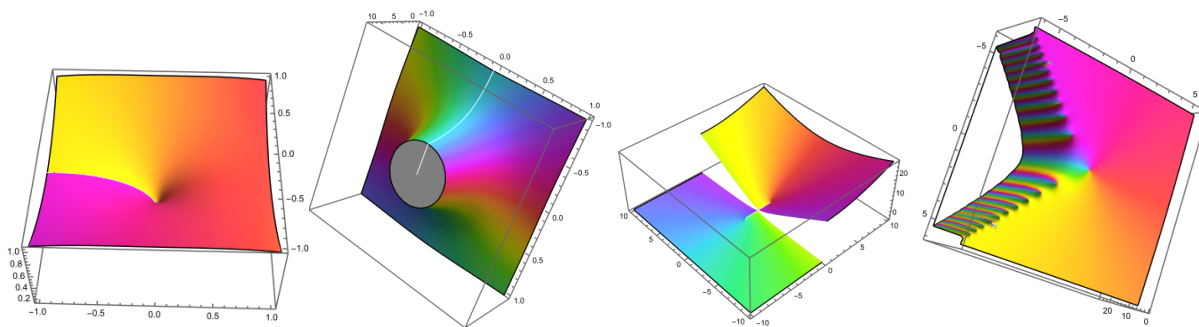
## Zeros of Wronskians on the complex plane and an introduction to special functions

2<sup>nd</sup> Nov 2022

*Abstract:* Given that all  $f_i$  are at least  $(n-1)$ -times differentiable, the Wronskian of the functions  $f_1, \dots, f_n$  is the determinant

$$W(f_1, f_2, \dots, f_n) = \det \begin{pmatrix} f_1 & f_2 & \dots & f_n \\ f_1' & f_2' & \dots & f_n' \\ \vdots & \vdots & \ddots & \vdots \\ f_1^{(n-1)} & f_2^{(n-1)} & \dots & f_n^{(n-1)} \end{pmatrix}.$$

This simple concept deals with linear (in)dependence of functions, and is related to the study of differential equations. In particular, we are interested in the zeros of Wronskians. It turns out that Wronskians can be used in the studies of special functions, which can have series or integral representations. Some visual examples of special functions will be provided. Lastly, I will say a few words regarding my summer project, in which I tried to locate zeros of Wronskians on the complex plane. Some understanding of differential equations and complex analysis will be useful.



Speaker: **Benjamin Yang**

Location: Gordon Street (25) Maths 707

Time: **3 - 4 pm**