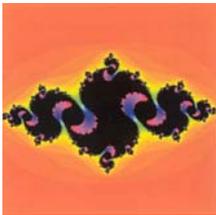


Research Interests:

Complex analysis and mathematical biology, in particular factorizations of meromorphic functions, complex dynamics, Smale's mean value conjecture, complex differential equations, biological sequence analysis and epidemic modelling.

A closer look at meromorphic functions

Theory on meromorphic functions, used to describe many physical phenomena and engineering problems, is being advanced by research at The University of Hong Kong. A better understanding of factorization and the complex dynamics of the functions will help mathematicians and physicists alike, says Dr Tuen-wai Ng.



Factorisation is about how a meromorphic function can become a function within a function. Complex dynamics studies how a function behaves under repeated substitutions. The behaviors can be represented graphically by Julia Sets (*pictured left*). One distinctive property of the Julia Set is its self-similarity; individual cells have the same pattern as larger blocks of cells. "The dynamical process is as chaotic as can be," said Dr Ng.

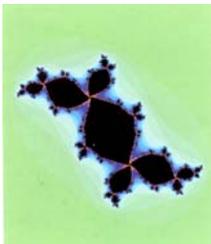
Many physics and engineering problems involve discovering the location of zeros, or critical points, of a function.

Often, zero-finding algorithms involve repeated substitutions and therefore a good knowledge of complex dynamics is important to understanding their efficiencies, said Dr Ng.

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亞純函數的深入研究

香港大學的研究人員，正推動亞純函數理論的發展。亞純函數可用於解釋許多物理學現象和工程學問題。吳端偉博士指出，加強對因子分解和複動力系統的了解，對數學家 and 物理學家都有幫助。



因子分解的作用，是了解亞純函數如何成為函數中的函數。複動力系統所研究的，是函數在重複疊代下的變化。疊代下的表現，可以用 Julia 集圖式來表達(左圖)。自我相似是 Julia 集的一個特質；單個細胞與較大的細胞群組有相同的模式。吳博士說：「在 Julia 集上，疊代過程可以有許多複雜便有多複雜。」

許多物理學和工程學問題，都涉及函數中零點或臨界點位置的發現。吳博士說，尋找零點的算法往往涉及疊代，因此深入認識複動力系統，對了解算法的效率很有用。

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