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Researcher solves 140-year-old maths problem

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ANI

WASHINGTON: A researcher at Imperial College London has achieved a major breakthrough in solving a problem that has defeated mathematicians for about 140 years.

Professor Darren Crowdy, Chair in Applied Mathematics, has achieved this success in an area of mathematics known as conformal mapping—a key theoretical tool used by mathematicians, engineers and scientists to translate information from a complicated shape to a simpler circular shape so that it is easier to analyse.

Conformal mapping has uses in a large number of fields, including modelling airflow patterns over intricate wing shapes in aeronautics. It is also being used in neuroscience to visualise the complicated structure of the grey matter in the human brain.

Two mathematicians developed a formula, known as the Schwarz-Christoffel formula, in the mid-19th century to carry out Conformal mapping. However, a major deficiency of the formula was that it only worked for shapes that did not contain any holes or irregularities.

Now, Professor Crowdy claims that the additions he has made to the Schwarz-Christoffel formula enable it to be used for more complicated shapes.

"This formula is an essential piece of mathematical kit which is used the world over. Now, with my additions to it, it can be used

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in far more complex scenarios than before. In industry, for example, this mapping tool was previously inadequate if a piece of metal or other material was not uniform all over - for instance, if it contained parts of a different material, or had holes," he said while explaining the significance of his work.

He says that his work has overcome such obstacles, and hopes that it will make way for the use of conformal mapping in diverse applications.

"With my extensions to this formula, you can take account of these differences and map them onto a simple disk shape for analysis in the same way as you can with less complex shapes without any of the holes," he said. A report on Professor Crowdy's improvements to the Schwarz-Christoffel formula has been published in the journal Mathematical Proceedings of the Cambridge Philosophical Society.



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