140 year old maths puzzle solved

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19th Century formula provides tool for engineers and scientists.

The Schwarz-Christoffel formula, developed in the 19th century, has been solved by an Imperial College London professor, Darren Crowdy, a Chair in Applied Mathematics. Professor Crowdy made a breakthrough in the problem 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 that is easier to analyse.

However, for 140 years there has been a deficiency in this formula: it only worked for shapes that did not contain any holes or irregularities. Now, the formula can be used for more complex irregular shapes.

The theoretical tool has had many applications in a number of fields including modelling airflow patterns over intricate wing shapes in aeronautics. It is also currently being used in neuroscience to visualise the complicated structure of the grey matter in the human brain.

Maths formula

However, now Professor Crowdy has made additions to the famous Schwarz-Christoffel formula which means it can be used for these more complicated shapes. He explains the significance of his work, saying: "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 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."

Now Professor Crowdy's work has overcome these obstacles and he says he hopes it will open up many new opportunities for this kind of conformal mapping to be used 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 added.

You've read it. Now review it.

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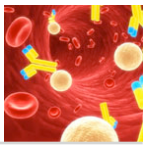

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