

Bored boffin cracks the elusive formula

It's been a question that has baffled the physicists for more than a century, now a professor has come up with an equation that could revolutionise aircraft design, writes **Ailsa Dixon**

A 140-YEAR-OLD maths problem that could hold the secret to streamlining aircraft design has been solved.

Professor Darren Crowdy of Imperial College London made the breakthrough in an area of maths known as conformal mapping while sitting bored in a lecture.

His brainwave has filled a gap in a formula that has been used since the mid-1800s to solve various mathematical and engineering problems, eventually including airflow over wing spans. Thanks to Prof Crowdy, it can now be applied to much more complicated wing

designs than ever before.

He said: "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

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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."

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.

The so-called Schwarz-Christoffel formula, named after the two mathematicians that came up with it, is a theoretical tool used to translate information from a complicated shape to a

simpler circular shape so that it is easier to analyse.

It is used frequently to model airflow patterns over intricate wing shapes in aeronautics, but is also currently being used in neuroscience to visualise the



EUREKA MOMENT: Professor Darren Crowdy, above, who came up with the formula

complicated structure of the grey matter in the human brain.

A spokesman from aircraft manufacturers Boeing said: "We use many different tools in our aircraft design, and are very keen to keep up to date with developments. We will consider this particular case when all the relevant data is made available."

Professor Crowdy's improvements to the Schwarz-Christoffel formula were published in the March-June 2007 issue of *Mathematical Proceedings of the Cambridge Philosophical Society*.

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