DIFFERENTIAL GEOMETRY/PDE SEMINAR

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Towards the Willmore conjecture

PETER TOPPING
(MSRI)

The Willmore energy of a surface immersed in R^3 is the integral over the surface of the square of the mean curvature. Willmore has conjectured that the Willmore energy of any torus is necessarily at least $2\pi^2$. We will sketch some of the progress made towards this conjecture over the past 40 years, including the work of Li-Yau and L.Simon, and go on to present a string of new partial results.

The value $2\pi^2$ arises in our work in terms of the volume of S^3, $SO(3)$ or $G_{2,4}$, and in terms of the length of shortest nontrivial loops in subgroups of $SO(4)$.