A Schoen type theorem for elliptic special Weingarten surfaces of minimal type

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Abstract

In this talk, we extend the theory of complete minimal surfaces in $\mathbb{R}^3$ of finite total curvature to the wider class of elliptic special Weingarten surfaces of finite total curvature; in particular, we extend the seminal works of L. Jorge and W. Meeks and R. Schoen. Specifically, we extend the Jorge-Meeks formula relating the total curvature and the topology of the surface and we use it to classify planes as the only elliptic special Weingarten surfaces whose total curvature is less than 4π. Moreover, we show that a complete (connected), embedded outside a compact set, elliptic special Weingarten surface of minimal type in $\mathbb{R}^3$ of finite total curvature and two ends is rotationally symmetric; in particular, it must be one of the rotational special catenoids described by R. Sa Earp and E. Toubiana. This answers in the positive a question posed in 1993 by R. Sa Earp. We also prove that the special catenoids are the only connected non-flat special Weingarten surfaces whose total curvature is less than 8π.

References

[1] Elliptic special Weingarten surfaces of minimal type in R3 of finite total curvature. Preprint; arXiv:1907.09122.