

# Gastvortrag

Mittwoch, 21. Dezember 2016  
14.00 Uhr  
Hörsaal 411

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A Willmore minimising Klein bottle in  
Euclidean four space

## Abstract:

The Willmore energy of an immersed surface  $f : \Sigma \rightarrow \mathbb{R}^n, n \geq 3$ , is defined as

$$\mathcal{W}(f) := \frac{1}{4} \int_{\Sigma} |H|^2 d\mu_g.$$

Willmore proposed in the 1960's that an immersion that minimises the energy over all possible immersions has presumably the optimal shape in the sense of bending energy. So it is almost natural to ask what the optimal shape of a Klein bottle is. In the first part, we want to show how a compactness result of  $W^{2,2}$ -conformal immersions of a closed Riemann surface into  $\mathbb{R}^n$  established by Kuwert and Li [3] can be used to find an “optimal” Klein bottle in Euclidean four space, [1] Afterwards we want to give some indications why it is more difficult in Euclidean three space. Having established the existence, we will present a candidate for the minimiser [2]. If time permits, we will outline how the minimisers in the other two regular homotopy classes of embeddings of a Klein bottle into  $\mathbb{R}^4$  can be found.

[1] P. Breuning, J. Hirsch, and E. Mäder-Baumdicker. Existence of minimizing Willmore Klein bottles in Euclidean four-space. 2016arXiv160401906B, April 2016.

[2] J. Hirsch and E. Mäder-Baumdicker. A note on Willmore minimizing Klein bottles in Euclidean space. 2016arXiv160604745H, June 2016.

[3] Ernst Kuwert and Yuxiang Li.  $W^{2,2}$ -conformal immersions of a closed Riemann surface into  $\mathbb{R}^n$ . *Comm. Anal. Geom.*, 20(2):313{340, 2012.