

Harmonic flow of geometric structures

Henrique Sá Earp¹.

¹ Imecc - Unicamp

We give a twistorial interpretation of geometric structures on a Riemannian manifold, as sections of homogeneous fibre bundles, following an original insight by C. M. Wood (2003). The natural Dirichlet energy induces an abstract harmonicity condition, which gives rise to a geometric gradient flow. We establish a number of analytic properties for this flow, such as uniqueness, smoothness, short-time existence, and some sufficient conditions for long-time existence. This description potentially subsumes a large class of geometric PDE problems from different contexts.

As an application, we recover the divergence-free torsion equation for G_2 -structures proposed by S. Grigorian (2017). We study the corresponding evolution problem, which runs among isometric G_2 -structures, recovering some analytic results independently established by L. Bagaglini (2017), S. Grigorian (2019) and Dwivedi-Gianniotis-Karigiannis (2019) in that context.

Ref: arXiv:1907.06072 [math.DG]