NUS National University of Singapore | Department of Mathematics, Faculty of Science

Research highlight: Flows on the PGL(V)-Hitchin component

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For a real, finite dimensional vector space V, the PGL(V)-Hitchin component is a distinguished component of the character variety of representations from a closed surface group to PGL(V). The representations in these components are known to have very good geometric properties. For example, they are all discrete and faithful [2]. The PGL(V)-Hitchin component itself is also known to be diffeomorphic to a cell [1], and comes equipped with a natural symplectic structure called the Atiyah-Bott-Goldman symplectic structure.

In this work [3], the authors describe, given an ideal triangulation on the surface, a new way to smoothly deform representations in the PGL(V)-Hitchin component. These deformations give families of smooth flows on the PGL(V)-Hitchin component, that they call "parallel flows". Using these flows, they describe a trivialization of the tangent bundle to the PGL(V)-Hitchin component. In a companion paper [4], they then show that these parallel flows are all Hamiltonian flows with respect to the Goldman symplectic structure. As a consequence, they find explicit global Darboux coordinates for this symplectic structure.

Reference:

[1] Nigel Hitchin, Lie groups and Teichmuller space, Topology 31 (1992), 449 – 473.

[2] François Labourie, Anosov flows, surface groups and curves in projective space, Invent, math. 165 (2006), 51 – 114.

[3] Zhe Sun, Anna Wienhard, Tengren Zhang, Flows on the PGL(V)-Hitchin, Geom. Funct. Anal. 30 (2020), 588 – 692.

[4] Zhe Sun, Tengren Zhang, The Goldman symplectic form on the PGL(V)-Hitchin component, 2017 preprint, arXiv:1709.03589.