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On uniqueness of heat flow of harmonic maps and hydrodynamic flow of nematic liquid crystals

Abstract. Abstract: We establish the uniqueness of the heat flow of harmonic maps that have sufficiently small renormalized energies. As corollaries, we obtain (i) the uniqueness of heat flow of harmonic maps whose gradients belong to $L_t^p L_x^q$ for $q > n$ and (p, q) satisfying Serrin's condition, and (ii) the uniqueness for hydrodynamic flow (u, d) of nematic liquid crystals, with $u, \nabla d$ satisfying Serrin's condition.
