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A Majumdar, JM Robbins and Maxim Zyskin* (M.Zyskin@bristol.ac.uk), Department of Mathematics, University of Bristol, Bristol, England. *Energy bounds for harmonic maps of polyhedra to sphere with tangent boundary conditions.*

Homotopy classes of continuous maps of polyhedra in R^3 to the two-sphere S^2 with tangent boundary conditions on the faces are classified by certain homotopy invariants (generalised degrees about the vertices, both in the bulk and on the faces, as well as directions along the edges). We establish a lower bound for the Dirichlet energy of such maps as a function of the homotopy invariants. For the case of a rectangular prism, we establish an upper bound which differs from the lower bound by a factor which depends only on the aspect ratios of the prism but not on the homotopy invariants. (Received July 26, 2005)