1023-35-1782   **Maxim Zyskin*** (`zyskin@yahoo.com`), Department of Mathematics, University of Oxford, Oxford, OX1 3LB, England. *Harmonic maps of polyhedra to a sphere with tangent boundary conditions on faces.*

Harmonic maps of polyhedra to a sphere describe stable configurations of nematic liquid crystal, and have important applications in displays. Such harmonic maps may have singularities at a discrete set of points-in particular tangent boundary conditions disallow continuity at vertices. Near singularity, the solution is typically radially-invariant. Radially-invariant reduction of harmonic map equations is integrable, and may be studied using methods of solving boundary-value problems for integrable equations. As a collorary, we obtain upper energy bounds for minimal energy for configurations of fixed topological type. In case of a rectangular prism, such upper bounds are proportional to the lower energy bounds. (Received September 26, 2006)