Supplementary Electronic Information: All toroidal embeddings of polyhedral graphs in 3-space are chiral

T. Castle, Myfanwy E. Evans and S.T. Hyde

(Dated: June 22, 2009)

~

The universal cover of a toroidal reticulation is formed by 'unzipping' the torus by a pair of perpendicular cuts, once around the outer equator of the torus, and once around a longtitudinal cycle surrounding the toroidal tube. This process gives a planar quadrilateral which forms a unit cell of a 2-periodic pattern; each unit cell describes a single copy of the torus. Conversely, the toroidal reticulation can be constructed from the universal cover in a manner animated in Film 1. First, a single unit cell of the 2-periodic cover is extracted from the pattern. This cell is then zipped together so that all points related by either of the two lattice vectors corresponding to the pair of blue and the pair of red quadrilateral edges are fused. The first (red) lattice vector zip gives a reticulation of a cylinder; the second (blue) zip identifies the cylinder ends, giving the torus. The resulting toroidal isotope embedding (green edges) is therefore fully determined by the universal cover. The example shown in Film 1 is the isotope containing a gemini pair of trefoil knots (Isotope B) illustrated in Fig. 3(b) in the paper.
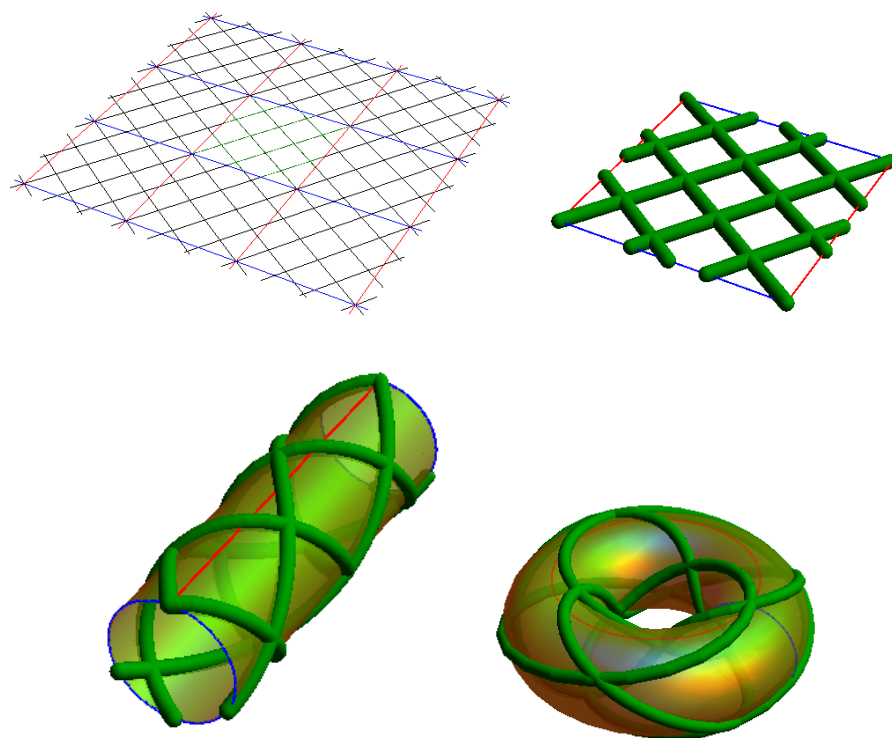
FIG. 1: Film 1. Selected frames of the computer animation showing the formation of a toroidal isotope (bottom right) from its universal cover (top left). The film can be found at *NJC to post* gemini_trefoils_final.swf *to url*; the .swf file can be viewed by opening within a web browser.