

STITCH MESHING CONTINUOUS GEOMETRIES AND HAND KNITTING

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This project presents a computational pipeline for converting arbitrary closed 3D meshes into hand-knitting patterns. To manage the complex parameter space of knitting, the initial focus will be on short-row shaping and double/triple left- and right-leaning increases and decreases. The proposed pipeline operates in three core stages: (1) converting an input triangular mesh into a quad-dominant mesh using specified boundary points and rotational symmetry; (2) processing this structure into a row- and column-based Reeb graph abstraction; and (3) translating this graph into a standard knitting instruction set. The fidelity and practicality of the generated patterns will be validated through a cycle of hand-knitting physical prototypes, which will also serve as an iterative debugging and refinement mechanism for the algorithm.