# Origami-kirigami approach to materials structures modelling

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Additive manufacturing and origami/kirigami principles fit together like a coffee cup and saucer. Recently derived translational surface with an elliptic curve (not an ellipse), as the governing one, led to constructing an origami-like object. Set of eight surfaces, each with a square-shaped orthogonal projection, turned out to be enchantingly similar to heaven-and-hell-origami. The Starting Translational Surface (STS), engaged in the presented work, is originally subjected to the selected linear and nonlinear transformations in two ways. The first one is dedicated to spacial placement of STS replicas. Shape STS variations represent the second approach. Square-shape of STS orthogonal projection is preserved during all the mappings. On the other hand, especially in this point, the similarity with origami/kirigami structures is broken; generally, square-shaped sheet of paper changes via folding. In our paper, preserved orthogonal projection offers suitable opportunities to illustrate a structure of the hypothetical material. Explicit and parametric equations of geometrical elements, transformational matrices and MATLAB application MuPAD serve as useful mathematical and computational tools for formal and graphical representation of the modeled structures.

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