3D Auxetic Structure of Ron Resch Pattern using 2D Plane Processing Machine
２次元平面加工機によるロンレッシュパターンを用いた３次元オーセティック構造

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Auxetic structures and auxetic smaterials are structures with negative Poisson's ratios, which behave in the opposite way to natural materials with positive Poisson's ratios. It is a material that expands using elastic deformation. Auxetic structures have been studied as scalable geometries because there are various geometries with negative Poisson's ratio in three dimensions by three-dimensional deformation. However, most of these studies are based on the premise that 3D printers are used for manufacturing. Since manufacturing constraints affect the cost of equipment and materials as well as manufacturing time, auxetic structure is rarely chosen as a structural option for the actual manufacturing of a product. Therefore, in this paper, propose a model "3D Auxetic Structure of Ron Resch Pattern using 2D Plane Processing Machine", which can be fabricated by planar machining of the 3D Auxetic structure already proposed. In the proposed structure, a three-dimensional auxetic structure can be created using only a two-dimensional machining tool by combining the existing structure created by planar machining. The proposed structure was analyzed and tested based on the results of Poisson's ratio, bistability, and load-displacement curves to demonstrate its properties as a complementary auxetic structure.

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