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(MICRO)COMPUTER APPLICATION FOR CREATION OF GEOMETRY OF OCTAHEDRON-BASED TWO-LAYERED SPHERICAL STRUCTURES

The topology and geometry of six structures presenting the beginning of family obtained according to the I method of spherical equilateral triangle subdivision [2], [3], (fig.1) were presented in this study. The selected family of two-layered frame domes was generated as a result of proper connections of single-layer octahedron-based structures.

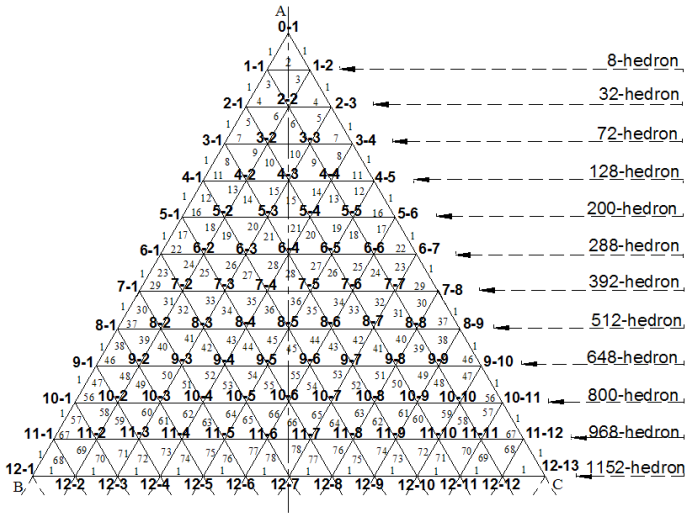

Fig. 1. Flat face division of regular octahedron to form among others 1152-hedron.

The lengths of individual structure's bars (fig.2) were calculated after determination of nodes' coordinates of domes corresponding to polyhedra' vertices. There is a possibility to read from each nomogram (fig.3) the bar groups' lengths of the first and second layers, joining bars for single- and two-layered structures as well as for which radius relation (R1 and R2) of spheres describing structure nodes, the lengths of individual bars'

groups are equal. The change of R1/R2 or R2/R1 allows for lengths of individual bars' groups change and structure thickness change.

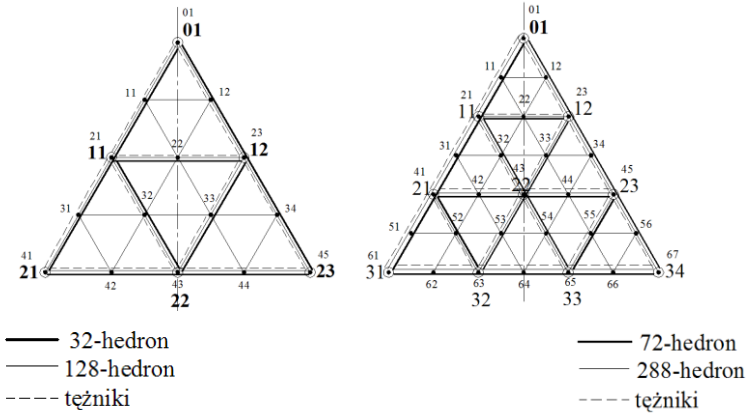

Fig. 2. Chosen topologies of two-layered bar structures (inscribed in one face of octahedron) generated from: a) 32-hedron and 128-hedron, b) 72-hedron and 288-hedron

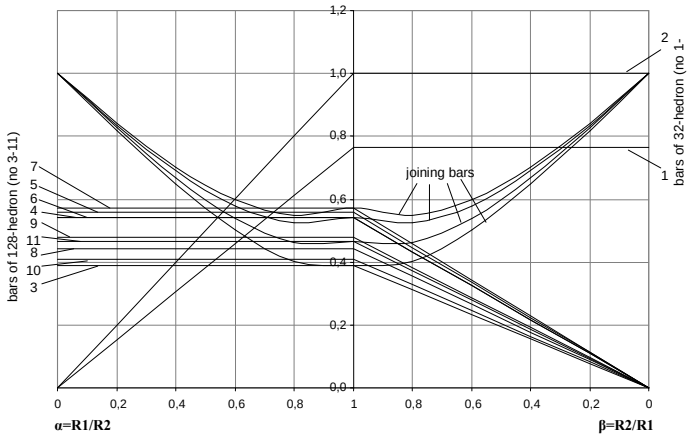

Fig.3. Nomogram of **m** coordinates of bars lengths exemplified by two-layered structure formed from 32-hedron and 128-hedron.

References :

[1] Fuliński J.: Geometria kratownic powierzchniowych. PWTN. Seria B 178, 1973.

[2] Mirski J.Z.: *Siatki powstałe z przekształceń 8-scianu foremnego.* ZN. AR we Wrocławiu. Melioracja XLI, nr 212/1992, s.27-39.

[3] Bysiec D., Mirski J.Z.: *Drtermining the geometric parameters of frame octahedron-based geodesic domes.* XIV LSCE. Warsaw, 5 December, 2008; page 28-33.