Hyperspherdisdodehedron

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In this paper I introduce a way of constructing a general hyperspherical disdyakis dodecahedron.

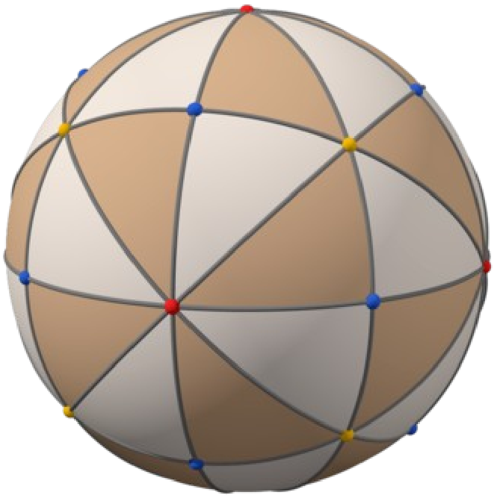

Illustration of a spherical disdyakis dodecahedron[1]

A hypersphere[2] is given by the following equation:

$\sum i : \mathbb{N} \{ x_i^2 \} = r^2$

$x : [\mathbb{R}]$
$r : \mathbb{R}$

By using a hypercube[3] map onto a hypersphere, one obtains the following solutions for a general hyperspherical disdyakis dodecahedron, which is nick named "hyperspherdisdodehedron":

$r = \mathrm{sqrt}(1 + i) \cdot p_i$

$p : [\mathbb{R}]$

Where \`$p_i$\` is a coefficient scaled with a vector \`$v_{ij}$\` such that one can calculate positions of points:

$\mathrm{position}_{ij} = v_{ij} \cdot p_i$

$\mathrm{position} : [[[\mathbb{R}]]]$
$v : [[[\mathbb{R}]]]$

Where \`$v_{ij}$\` is some permutation of a vector \`$w_i$\`:

$w_i = (\pm 1, \pm 1, \ldots, \pm 1, 0, 0, \ldots 0)$

The number of zeroes in the vector is \`i\`.
The total length corresponds to the dimensions of the hypersphere.
This vector is balanced ternary[4] since it only contains \`-1, 0, 1\`.

References:

[1] “Disdyakis dodecahedron”
Wikipedia
https://en.wikipedia.org/wiki/Disdyakis_dodecahedron

[2] “n-sphere”
Wikipedia
https://en.wikipedia.org/wiki/N-sphere

[3] “Hypercube”
Wikipedia
https://en.wikipedia.org/wiki/Hypercube

[4] “Balanced ternary”
Wikipedia
https://en.wikipedia.org/wiki/Balanced_ternary