Dear List members,

For over a decade many list members, prominent among them Gerry, have helped me to push the idea of a shallow cap icosahedron dome. As truncation planes for many variants of geodesic domes are well known, and a shallow cap is one such truncation, the task resolved to calculate strut lengths so as to reach a surface area and a height with a new radius.

Now for an agriculture university, I want to guide a fabricator as to how to fabricate a nexorade greenhouse of approximately 2,000 sq ft area (radius approximately 26 feet) and a height of about 16 to 17 feet. As the truncation planes of nexorades are not known to me presently, I am choosing an arbitrary height range and will look for truncation planes later around that height range.

The structure is to be made of bamboo splits.

The reason for seeking a shallow nexorade is that the location, Guntur city in Telengana state in India, faces hurricanes of 120 Kmph at least once a year, if not more. The high speed winds at higher heights will rip away polythene film that will cover the greenhouse. Lower height reduces such chances plus replacement cost is less due to lesser surface area.

In Feb 20, 2019, Lev and Adrian had set out a full set of calculations for a large family of nexorades of which I have chosen ‘geo\_+3\_0 =nex\_63\_(6,3) 2/3 ‘ to implement the green house as bamboo poles to cut nexors of required long lengths are readily available.

In the diagram below, *R* is the radius which generates a circular base of the area that you want to build. The height from the top of the structure towards the base is called *h.* The radius at height *h* is to be calculated and is called *r.*

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In the right angle triangle ABO, we have

R^2 = r^2 +(R-h)^2

Or r^2 =R^2 - (R-h)^2

 r^2 =R^2 -R^2 +2hR -h^2

If we desire that the height *h* should be 65 % of the radius R, then on substitution in above we get

 r^2 = 2\*0.65R\*R -(0.65\*0.65 R^2+ or 1.3R^2 -0.4225R^2 or = 0.8775R^2

Thus *r* =0.937 R

We now use proportionality to find the new radius of the nexorade that will give us the desired surface area. Call it *Rn*.

Rn = 1/r or 1/0.937 R or 1.067R or if R = 26 then Rn = 27.75

Now we can use the radius of 27.75 in ‘geo\_+3\_0 =nex\_63\_(6,3) 2/3 ‘ to get the all the four nexors and look for a truncation plane around 17 feet. Or thereabouts.

Truncation fields are easily found by changing the orientation of the nexorade. We can place at the top, a vertex, a nexor, or a face.

If I knew the command to generate ‘geo\_+3\_0 =nex\_63\_(6,3) 2/3 ‘ in anti-prism, I could do this task myself.

Is there a command to draw a truncation plane in a nexorade?

Please forgive if this long post is pedestrian in nature.

Regards

Ashok