Property of a curve connecting any two points in space that are at different differences from a third point

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Abstract: In this paper we prove that any two points A and B in space that are at different distances from a third point C, when connected by any curve in three dimensional space, must contain points such as D that are at intermediate distances from the third point C (length DC is intermediate to length AC and length BC).

Proof: In a previous paper (1) we proved the properties of a curve that lies in the same plane as points A,B,C. In this paper we extend the results to properties of three dimensional curves connecting the two points.

Consider three points A,B,C. Let length AC< length BC. So B is farther from C than A.

Draw a sphere of length AC centered on C. The surface of this sphere will have the point A.

Draw a sphere of length BC centered on C. The surface of this sphere will have the point B.

Consider any sphere of arbitrary radius "r" centered on C where length AC< length "r"< Length BC.

So we are looking at three concentric hollow spheres, point A lies on the surface of the inner most sphere which is at the core, point B lies on the surface of outer most sphere. Sphere of radius "r" lies in the space between the two spheres. Therefore point A lies within the sphere of intermediate radius "r" and point B lies outside the sphere of intermediate radius. Therefore any curve in three dimensional space connecting the points A and B must intersect the sphere of radius "r" at its surface at atleast one point such as D. Since "r" is an arbitrary distance any number of values of "r" of value intermediate between length AC and length BC are possible. Therefore any number of such points of intermediate distance from point C must be present on ANY curve connecting A and B.

References:
(1) Regarding Three Points in a Plane Such that Two Points Are Non-Equidistant from the Third Point and a Predicted Property of Any Curve in that Plane Connecting the Two Non-Equidistant Points
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