Divine Simplicity and Triangle Centers

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The doctrine of divine simplicity states that in God there is no distinction between his essence and his existence—that is to say, there is no distinction between *what* he is, and *that* he is. If there were such a distinction, then there would need to be some reason, some cause outside of God which conjoins his essence and existence into one metaphysical whole. In other words, such a distinction would require the actualization of a potential in God, but since God is pure act, and in him there is no potentiality, it must be the case that in him there is no such distinction between his essence and his existence.

What follows from this is that anything else we might attribute to God—power, goodness, love, intellect, etc.—are all different ways of describing this one, central reality of pure actuality where essence and existence coincide, i.e. God. God's essence *just is* his existence, which *is* his power, which *is* his goodness, which *is* his love, which *is* his intellect, and so on. At first glance this seems unintelligible. It is clear that the power, goodness, love and intellect of Socrates, for example, are all distinct realities. But, of course, the essence and existence of Socrates are also distinct realities, as they would be in any created being. Nevertheless because the later coincide in God, so the doctrine states, so do the former.

The goal here is not to defend this doctrine, or even to examine it any further. The goal, instead, is to explore an analogy between this doctrine and something that is perhaps a bit easier to understand—triangles. In God, the doctrine states, there is no distinction between his essence, existence, power, goodness, etc., yet clearly in created beings there are such distinctions. Looking at triangles, and specifically triangle centers, we can see a case where something similar holds.

The inspiration for this paper came from an event which took place on the evening of January 13^{th}, 2018, where Bishop Robert Barron and Professor William Lane Craig engaged in a public dialogue concerning apologetics and evangelization. Earlier that day, a closed group of Protestant and Catholic scholars came together for an academic symposium. The symposium was split into two sessions. In the first session, Bishop Barron delivered a paper on the doctrine of divine simplicity, Professor Craig responded, and then there was open discussion between all of the scholars present. The second session proceeded likewise with Professor Craig delivering a paper on the doctrine of the atonement. Video recording of the public dialogue and audio recording of the two symposium sessions can be found here. During the open discussion on the subject of divine simplicity, one of the scholars made the following remarks[*].

> *In triangles you can have different centers. So you've got the place where the altitudes meet, you've got the place where the perpendicular bisectors meet, you've got all these different kinds of centers, and they have different names. In the case of an equilateral triangle, they're all the same point, but they all still meet the definition. All those definitions apply to that one same point. So in God you've got something like that, where his existing is not something different from his loving, which is not something different from his understanding, which is not something different from his being a substance.*

It is this analogy that will be explored. We will look at the four classic triangle centers well known by the ancient Greeks—the Centroid, the Incenter, the

[*] Time stamp approximately 47 : 50 - If anyone knows who this scholar is it would be great if you could inform me.

Circumcenter, and the Orthocenter. We will then show, by means of a simple graphic, that these four centers all coincide for an equilateral triangle. Thus we will have a situation like that described by the doctrine of divine simplicity - that is to say, that although in non-equilateral triangles these centers are distinct points, in equilateral triangles these centers all coincide at the same point, despite the fact that each center has a different description. More remarkable still, it turns out that *all* triangle centers[†] coincide for equilateral triangles. The proof is not terribly difficult to understand once some underlying concepts are explained, but nevertheless we will not undertake that project here.

Four Classic Triangle Centers

We first must review some terminology related to triangles in order to give accurate descriptions of each triangle center.

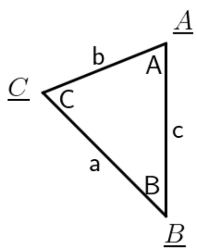


Figure 1: A Triangle

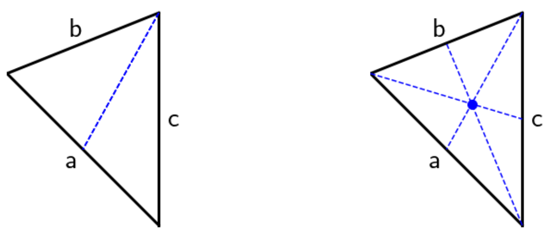
A triangle can be constructed by first selecting three points on the Euclidean plane which do not fall on the same line. These points are called the vertices of the triangle. The vertices of a triangle are commonly labeled as the vectors $\underline{A}$, $\underline{B}$, and $\underline{C}$. We then connect each pair of vertices with a straight line. These are

[†]Of which there are thousands known, see here.

called the sides of the triangle. The sides of a triangle are commonly labeled by their lengths a, b, and c, where a is the length of the side opposite vertex $\underline{A}$, b is the length of the side opposite vertex $\underline{B}$, and c is the length of the side opposite vertex $\underline{C}$. The angle between sides b and c is labeled as A, the angle between sides c and a is labeled as B, and the angle between sides a and b is labeled as C. All of these labels can make the picture of our triangle rather crowded, but note that if just the sides are labeled, or just the angles are labeled, or just the vertices are labeled, we can deduce everything else[‡]. For that reason, we choose (arbitrarily) only to label the sides of the triangle. We can now define and show the four classical triangle centers well known to the ancient Greeks on an example triangle.

Centroid

A median line of a triangle connects a vertex to the midpoint of the opposite side. The Centroid of a triangle is defined as the point where the three median lines of the triangle intersect.



(a) The median line connecting vertex $\underline{A}$ to side a

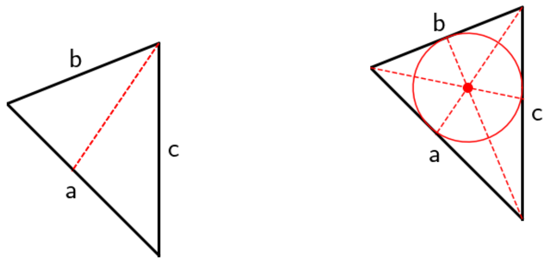
(b) All three median lines intersect at a single point

Figure 2: The Centroid

[‡]In fact, we really only need two of the sides labeled, or two angles, or two vertices.

Incenter

An angle bisector of a triangle is a line which splits an angle of a triangle into two equal parts. The Incenter of a triangle is defined as the point where the three angle bisectors of the triangle intersect. The Incenter is also the center of the circle inscribed in the triangle.



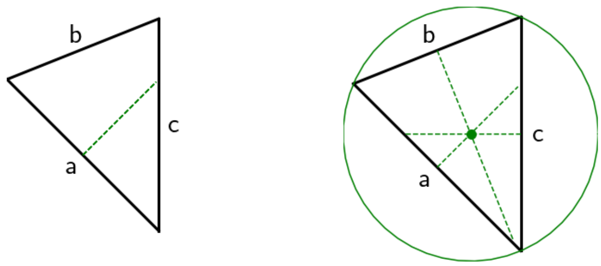
(a) The angle bisector splitting angle A

(b) All three angle bisectors intersect at a single point

Figure 3: The Incenter

Circumcenter

A perpendicular bisector of a triangle is a line perpendicular to, and passing through, the midpoint of a side of the triangle. The Circumcenter of a triangle is defined as the point where the three perpendicular bisectors of the triangle intersect. The Circumcenter is also the center of the circle which circumscribes the triangle.



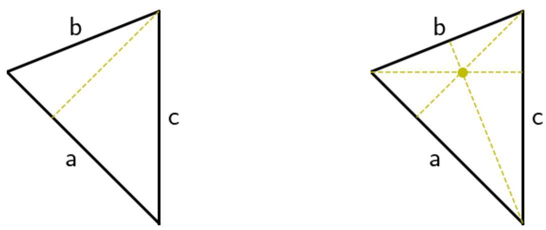
(a) The perpendicular bisector passing through side a

(b) All three perpendicular bisectors intersect at a single point

Figure 4: The Circumcenter

Orthocenter

An altitude of a triangle is a line through a vertex and perpendicular to the opposite side. The Orthocenter of a triangle is defined as the point where the three altitudes of the triangle intersect.



(a) The altitude passing through side a

(b) All three altitudes intersect at a single point

Figure 5: The Orthocenter

Let us now plot these four centers on the example triangle to see that they each represent a distinct point.

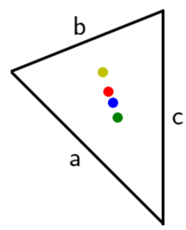
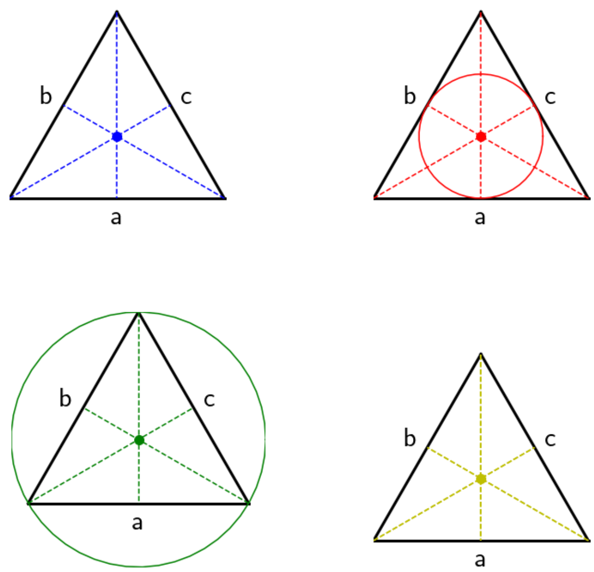


Figure 6: The Centroid, Incenter, Circumcenter and Orthocenter

At this point we have defined the four classic triangle centers and we have given an example of a (non-equilateral) triangle where they all represent distinct points. Now let us investigate these centers on an equilateral triangle, that is, a triangle whose sides are of equal length. For an equilateral triangle, the median lines, angle



bisectors, perpendicular bisectors, and altitudes are all identical[§]. Therefore, the

[§]Take a moment to convince yourself that the lines drawn on the equilateral triangles indeed

Centroid, Incenter, Circumcenter and Orthocenter all coincide in an equilateral triangle.

Now let us bring the discussion back to divine simplicity. For created beings such as Socrates existence, essence, power, goodness, love and intellect are all distinct realities—yet, the doctrine of divine simplicity states, these realities all coincide in God. In an analogous way, for a non-equilateral triangle the Centroid, Incenter, Circumcenter and Orthocenter are all distinct points—yet, as we have just seen, these points all coincide in an equilateral triangle. Therefore the Centroid of an equilateral triangle *just is* the Incenter, which *is* the Circumcenter, which *is* the Orthocenter, just as God's essence *just is* his existence, which *is* his power, which *is* his goodness, which *is* his love, which *is* his intellect, and so on. Thus although the doctrine of divine simplicity seems unintelligible at first glance, we have something easier to grasp which is analogous to it. This suggests the doctrine may not be unintelligible as it first appears.

meet their respective definitions, i.e. that the blue lines meet the definition of median lines, the red lines meet the definition of angle bisectors, the green lines meet the definition of perpendicular bisectors, and the yellow lines meet the definition of altitudes.