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Peer Review

Review of: "Patterns of Squares Around an Arbitrary Triangle"

Vesna Marinković[1]

1. Faculty of Mathematics, University of Belgrade, Serbia

This paper introduces a generalization of the Pythagorean theorem, featuring four hinged squares around an arbitrary triangle. It is shown that the sums of the areas of opposite squares follow specific recurrence relations. Some of the obtained sequences are already listed in the Online Encyclopedia of Integer Sequences (OEIS), but here, for the first time, their geometric interpretation is given, and one of the obtained sequences is not yet listed in OEIS. Another strength of the paper is the use of vector-based methods, thus avoiding trigonometric calculations.

However, I would suggest that the authors improve the structure of the paper, add a conclusion section, unify the way the equations are given (some are aligned left, and some centrally), etc. I also believe that adding some clarification and additional explanation would contribute to the quality of the paper. Some specific comments follow:

-- Figure 1: Since we differentiate between red and blue squares in the figure, I would suggest that in the figure caption, instead of "triangle (red)," it says "triangle (shaded red)," and also to say that red squares satisfy the Pythagorean theorem, while blue squares satisfy the Pythagorean fivefold.

-- Figure 2 is a little bit blurry, so one cannot easily read the squares' markings.

-- Squares of the third, fifth, ... ring -> maybe it's better to say that these are squares of odd-numbered rings; similarly for the fourth, sixth, ... ring.

-- Moreover, since the vectors a and a′ have the same length, as well as the vectors b and b′, and the same angle between them -> I guess it is important that the angle between vectors a and b, and a' and b' are equal, not a and a', and b and b'.

-- The sum of the areas of the squares on the non-equal sides of two triangles with two equal sides and supplementary enclosed angles is double the sum of the areas of the squares on the equal sides ->

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I would suggest adding to which triangles in Figure 3 the statement refers (I guess ABC and CGD) and also to explicitly state which sides are equal and which angles are supplementary.

-- Using these expressions, the sums of the areas of opposite squares are equal since: -> maybe refer in the text to the corresponding squares on Figure 5 by colors.

-- Note that the angles between the vectors a and b -> Note that the angle between the vectors a′ and b' (additionally, do we refer here to convex or oriented angles?).

-- Note that the angles between the vectors a′and b' and the angle between the vectors a and b sum up to 270° -> shouldn't there be -b instead of b?

-- Add a more detailed caption to Figure 4.

-- Generalization of the Pattern of Four (Hinged) Squares around an Arbitrary Triangle -> It is not advisable for the section to start with: "For i≥2:", there should be some introduction sentence...

-- Now, using (1), (2): -> There are no equations marked as (1) and (2), and in the following sequence of equations, there is (1), (2), and then again (1).

-- In a similar way, we find that: -> the following sequence of equations should be formatted as the previous one, in a couple of rows instead of one.

-- In an analogous way: -> the verb is missing.

Declarations

Potential competing interests: No potential competing interests to declare.

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