Hatzipolakis Triangles

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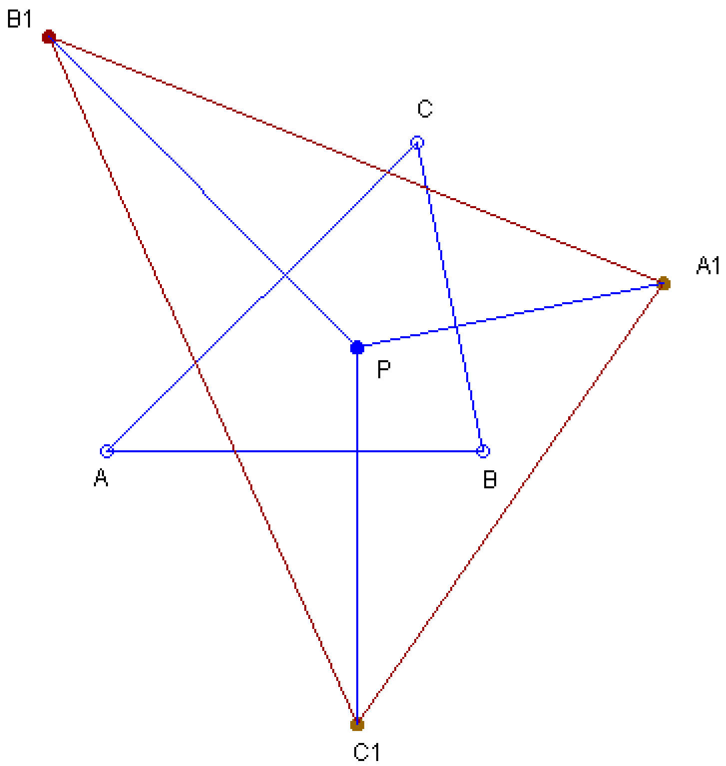
Abstract. We define Hatzipolakis triangles and use the computer program "Machine for Questions and Answers" to study properties of Hatzipolakis triangles.

Given a triangle ABC and a Triangle Center, labeled by P. Construct segment PA_1 perpendicular to line BC and with length equal to the length of the side BC. Construct segment PB_1 perpendicular to line CA and with length equal to the length of the side CA. Construct segment PC_1 perpendicular to line AB and with length equal to the length of the side AB. We call triangle $A_1B_1C_1$ the *Hatzipolakis Triangle of the Triangle Center.*

See the Figure:



P - Triangle Center;
PA_1 - segment perpendicular to line BC and with length equal to the length of the side BC;
PB_1 - segment perpendicular to line CA and with length equal to the length of the side CA;
PC_1 - segment perpendicular to line AB and with length equal to the length of the side AB;
$A_1B_1C_1$ - Hatzipolakis Triangle of the Triangle Center.

In this Figure:
P - Incenter;
PA_1 - segment perpendicular to line BC and with length equal to the length of the side BC;
PB_1 - segment perpendicular to line CA and with length equal to the length of the side CA;
PC_1 - segment perpendicular to line AB and with length equal to the length of the side AB;
$A_1B_1C_1$ - Hatzipolakis Triangle of the Incenter.

Jean-Pierre Ehrmann [3] gave a description of the locus of the points for which the Hatzipolakis triangle is perspective with Triangle ABC.

Examples

The Machine for Questions and Answers produces theorems related to properties of general and specific Hatzipolakis triangles. A few examples of properties related to Hatzipolakis triangles are given below.

For any Triangle Center, the Hatzipolakis Triangle of the Triangle Center is similar to the Pedal Triangle of the Symmedian Point.

The Hatzipolakis Triangle of the Incenter is perspective with the Intouch Triangle.

The Hatzipolakis Triangle of the Centroid is perspective with the Medial Triangle.

The Hatzipolakis Triangle of the Centroid is perspective with the Anticomplementary Triangle.

The Hatzipolakis Triangle of the Circumcenter is perspective with the Medial Triangle.

The Hatzipolakis Triangle of the Circumcenter is perspective with the Tangential Triangle.

The Hatzipolakis Triangle of the Circumcenter is perspective with the Circum-Incentral Triangle.

The Hatzipolakis Triangle of the Orthocenter is perspective with the Orthic Triangle.

The Hatzipolakis Triangle of the Orthocenter is perspective with the Circum-Orthic Triangle.

The Hatzipolakis Triangle of the Orthocenter is perspective with the Half-Orthic Triangle.

The Hatzipolakis Triangle of the de Longchamps Point is perspective with the Anticomplementary Triangle.

The Hatzipolakis Triangle of the Bevan Point is perspective with the Extouch Triangle.

The Hatzipolakis Triangle of the Bevan Point is perspective with the Excentral Triangle.

The Hatzipolakis Triangle of the Weill Point is perspective with the Intouch Triangle.

The Hatzipolakis Triangle of the Inner Vecten Point is perspective with the

Anticomplementary Triangle.

Invitation

The reader is invited to submit a note/paper containing

- synthetic proofs of theorems from this paper,
- or, applications of theorems from this paper,
- or, additional references related to this paper.

Definitions

We use the definitions in accordance with [1 - 6] and papers published in this journal.

The Level

The Machine for Questions and Answers is used to produce results in this paper. Currently the Machine has 6 levels of depths - 0,1,2,3,4,5. We use for this paper the level 0, that is, the Machine produces only elementary results. If we need deeper investigation, we have to use a level bigger than 0. Since the Machine for Questions and Answers produces too many results, it is suitable we to use bigger levels upon request, that is, for specific questions.

Thanks

The figure in this note is produced by using the program C.a.R. (Compass and Ruler), an amazing program created by Rene Grothmann. The Grothmann's program is available for download in the Web: Rene Grothmann's C.a.R.. It is free and open source. The reader may verify easily the statements of this paper by using C.a.R. Many thanks to Rene Grothmann for his wonderful program.

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