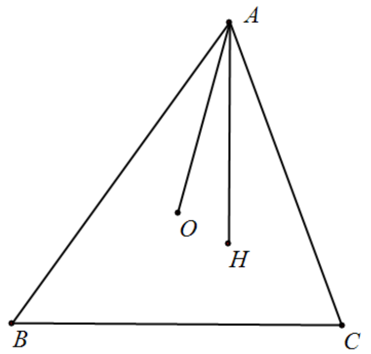

Example 6 : As shown in Figure 10, in $\triangle ABC$, O and H are the circumcenter and orthocenter respectively, to prove: $\angle BAO = \angle CAH$. If $\angle B < \angle C$, then $\angle ACB = \angle ABC + \angle HAO$.

$$\left(\frac{\frac{B-A}{B-C}\frac{A-H}{A-O}}{\frac{C-B}{C-A}}\right)^2 = -\left(\frac{A-H}{B-C}\right)^2 \frac{\frac{B-A}{B-O}}{\frac{A-O}{A-B}} \frac{\frac{A-C}{A-O}}{\frac{C-O}{C-A}} \frac{\frac{B-O}{B-C}}{\frac{C-B}{C-O}},$$

$$\left(\frac{\frac{A-C}{A-H}}{\frac{A-O}{A-B}}\right)^2 = -\left(\frac{B-C}{A-H}\right)^2 \frac{\frac{B-A}{B-O}}{\frac{A-O}{A-B}} \frac{\frac{A-C}{A-O}}{\frac{C-O}{C-A}} \frac{\frac{B-O}{B-C}}{\frac{C-B}{C-O}},$$

Make a question, use the combination of known conditions

Another proof: Suppose $O=0$, $H=A+B+C$, $\frac{\frac{A-0}{A-B}}{\frac{A-C}{A-(A+B+C)}}=T$, $\frac{\frac{A-0}{A-B}}{\frac{B-A}{B-0}}=T_1$, $\frac{\frac{C-B}{C-0}}{\frac{B-0}{B-C}}=T_2$, $\frac{\frac{C-0}{C-A}}{\frac{A-C}{A-0}}=T_3$, then $T=T_1+T_3-T_1T_2T_3$, the relationship between line segments $AB^2+AC^2=BC^2+AB\cdot AC\cdot\frac{AH}{AO}$.