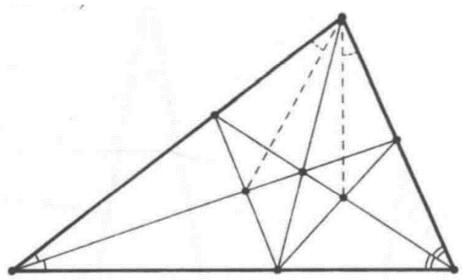

Example 52 : As shown in the figure, in $\triangle ABC$, I is the center, AD, BE, CF are the angle bisectors, DF intersects BI at P, and DE intersects CI at Q. Prove: $\angle CAQ = \angle PAB$.

Proof: Suppose $I=\frac{aA+bB+cC}{a+b+c}$, then $P=\frac{aA+2bB+cC}{a+2b+c}$, $Q=\frac{aA+bB+2cC}{a+b+2c}$,

$$\frac{\frac{A-P}{A-B}}{\frac{A-C}{A-Q}}+\frac{2(a+2b+c)}{a+b+2c}\frac{\frac{B-P}{B-C}}{\frac{B-A}{B-P}}+\frac{2(a+b+2c)}{a+2b+c}\frac{\frac{C-Q}{C-A}}{\frac{C-B}{C-Q}}=\frac{2a^2+4ab+2b^2+4ac+5bc+2c^2}{(a+2b+c)(a+b+2c)}$$