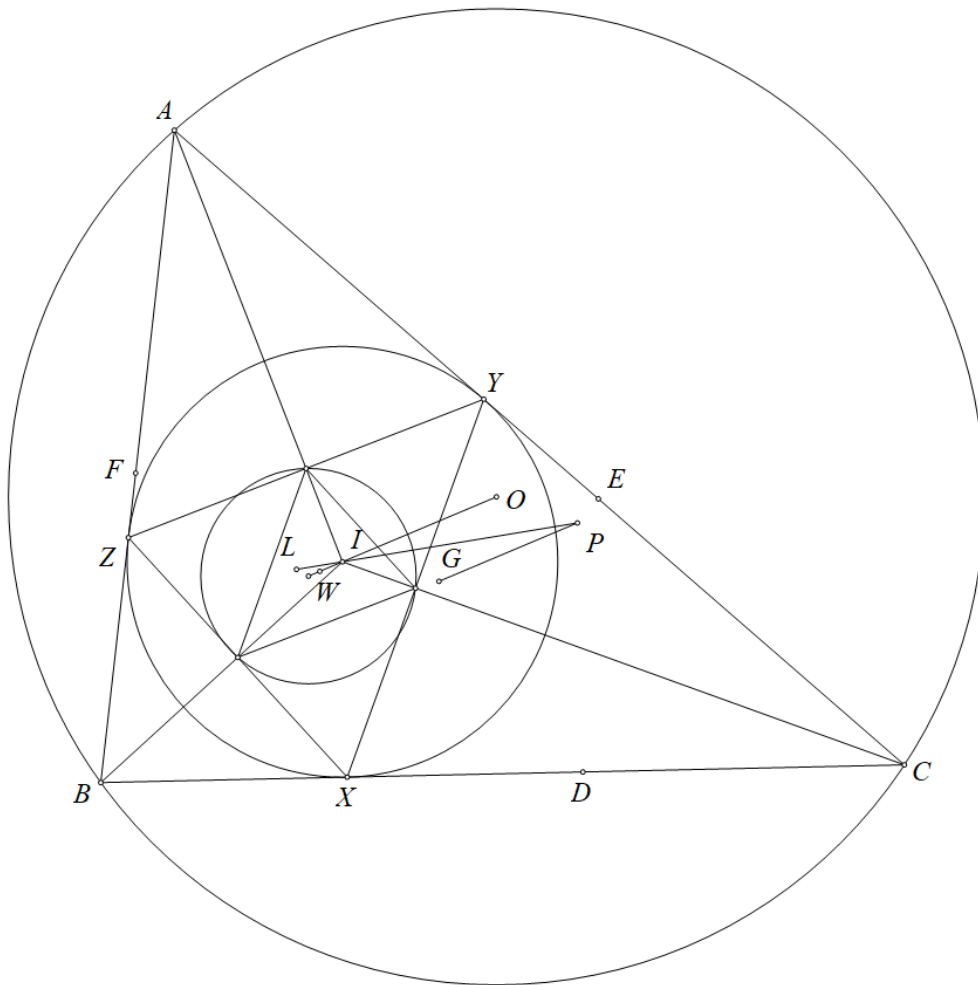


Problem 3

Ha Vu Anh

From the solution of problem 1, we have the following generalized problem, which is already proven:
 Let X, Y be 2 arbitrary points such that L, X, Y are collinear, then the line connecting X with the centroid of its pedal triangle WRT triangle ABC , and the line connecting Y with the centroid of its pedal triangle WRT triangle ABC , are parallel.

Considering the main problem:



Let $X \equiv I, Y \equiv P$, then let XYZ be the pedal triangle of I WRT ABC , W being the centroid of XYZ then $PG \parallel IG$. Furthermore, inversion center I with the power of r^2 send the Euler triangle of triangle DEF to (ABC) , hence IO passes through the nine-point center of triangle DEF , or OI is the Euler line of $\triangle DEF$, therefore O, I, G are collinear.
 Hence $PG \parallel OI$, as desired.