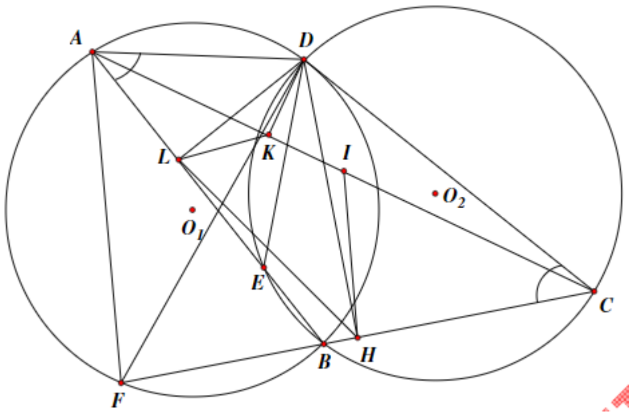
Example 189 : As shown in Figure 1 , the quadrilateral $ABCD$, $\angle DAB = \angle BCD$, draw perpendicular segments DL, DH, DK through D to AB, BC, CA, and I is the midpoint of AC. Prove: K, L, H, I 4 points in a circle.



Proof: $$\frac{\frac{K-H}{K-L}}{\frac{I-H}{I-L}}=\frac{\frac{B-A}{A-D}}{\frac{K-L}{K-D}}\frac{\frac{C-D}{B-C}}{\frac{K-D}{K-H}}\frac{\frac{A-D}{A-B}}{\frac{F-D}{B-C}}\frac{\frac{C-E}{F-A}}{\frac{D-C}{D-F}}\frac{A-F}{I-H}\frac{L-I}{E-C}.$$

Explanation: Assuming that AB intersects $\odot O_2$ with E, it is easy to prove that

$\triangle DAE$ is an isosceles triangle. Let BC intersect $\odot O_1$ at F, it is easy to prove

that $\triangle DFC$ is an isosceles triangle. Then $LK \parallel EC$, $IH \parallel AF$, $\triangle DAE \backsim \triangle DFC$, $\triangle DAF \backsim \triangle DEC$