Example 2 16 : As shown in the figure, there are five points A, B, C, D, E *on* circle O, $CO \perp AB$, CD, CE intersect AB at F, G, to prove: F, G, E, D share a circle .

$$\frac{\frac{D-E}{D-C}}{\frac{E-C}{G-F}}=\frac{F-G}{C-O}\left(\frac{C-O}{C-E}\frac{D-E}{D-C}\right)$$

Example 67 *The circle IBC is orthogonal to the circle on I_bI_c as diameter.*

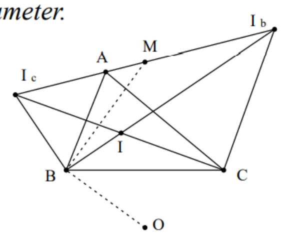

Figure 67

Point order: $a, b, c, i, o, b1, c1, m$.

Hypotheses: incenter(i, a, b, c), circumcenter(o, b, c, i), coll$(b1, b, i)$, perp$(b1, c, c, i)$, coll$(c1, c, i)$, perp$(c1, b, b, i)$, midpoint$(m, b1, c1)$.

Conclusion: perp(m, b, o, b).

The Machine Proof

$[mb, ob] + 1$

(Since circumcenter$(m,b, c, b1)$; $[mb, ob] = [mb, bc] + [bc, ob] = -[b1c, b1b] - [ob, cb] + 1$.)

$= -[b1c, b1b] - [ob, cb]$

(Since $b1c \perp ci$; $[b1c, b1b] = -[b1b, ic] + 1$.)

$= [b1b, ic] - [ob, cb] - 1$

(Since b, $b1$, i are collinear; $[b1b, ic] = -[ic, ib]$.)

$= -[ob, cb] - [ic, ib] - 1$

(Since circumcenter(o,b, c, i); $[ob, cb] = [ob, bc] = -[ic, ib] + 1$.)

$= 0$