Let $i = 1, 2, 3$, $\xi_i, \eta_i \in \mathbb{R}^2$, $\mu_i > 0$ such that

$$\sum_i \mu_i \xi_i = 0, \sum_i \mu_i \eta_i = 0, \sum_i \mu_i \xi_i \wedge \eta_i = 0, \sum_i \mu_i \xi_i \cdot \eta_i = 0.$$

Let $M = \sum_i \mu_i$, $I(\xi) = \sum_i \mu_i \xi_i^2 = M^{-1} \sum_{i<j} \mu_i \mu_j (\xi_i - \xi_j)^2$. Then

$$\frac{\mu_k \xi_k^2}{I(\xi)} = \frac{\mu_i \mu_j (\eta_i - \eta_j)^2}{M I(\eta)}, \quad \frac{\mu_k \eta_k^2}{I(\eta)} = \frac{\mu_i \mu_j (\xi_i - \xi_j)^2}{M I(\xi)},$$

$$\frac{\mu_k \xi_k^2}{I(\xi)} + \frac{\mu_k \eta_k^2}{I(\eta)} = \frac{\mu_i \mu_j (\xi_i - \xi_j)^2}{M I(\xi)} + \frac{\mu_i \mu_j (\eta_i - \eta_j)^2}{M I(\eta)} = \frac{\mu_i + \mu_j}{M}$$

and

$$\frac{\xi_i \wedge \xi_j}{I(\xi)} + \frac{\eta_i \wedge \eta_j}{I(\eta)} = 0.$$