Abstract. Let F be a closed surface. If $i, i' : F \to \mathbb{R}^3$ are two regularly homotopic generic immersions, then it has been shown in [N] that all generic regular homotopies between i and i' have the same number mod 2 of quadruple points. We denote this number by $Q(i,i') \in \mathbb{Z}/2$. For F orientable we show that for any generic immersion $i : F \to \mathbb{R}^3$ and any diffeomorphism $h : F \to F$ such that i and $i \circ h$ are regularly homotopic,

$$Q(i, i \circ h) = \Big(\mathrm{rank}(h_* - \mathrm{Id}) + (n+1)\epsilon(h)\Big) \bmod 2,$$

where h_* is the map induced by h on $H_1(F, \mathbb{Z}/2)$, n is the genus of F and $\epsilon(h)$ is 0 or 1 according to whether h is orientation preserving or reversing, respectively.

We then give an explicit formula for $Q(e, e')$ for any two regularly homotopic embeddings $e, e' : F \to \mathbb{R}^3$. The formula is in terms of homological data extracted from the two embeddings.