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Euclidean Symmetry of Closed Surfaces Immersed in 3-Space

(Joint work with Thomas W. Tucker.) Given a finite group G of orientation-preserving Euclidean isometries and a closed surface S , an immersion $f : S \rightarrow E^3$ is in G -general position if $f(S)$ is invariant under G , points of S have disk neighborhoods whose images are in general position, and no singular points of $f(S)$ lie on an axis of rotation of G . For such an immersion, there is an induced action of G on S whose Riemann-Hurwitz equation satisfies certain natural restrictions. Riemann-Hurwitz equations fulfilling these restrictions are realized by a G -general position immersion of S in most cases. Exceptions arise, in particular, for low genus and few branch points. In this talk, we review these results and consider the more general case of G containing orientation-reversing Euclidean isometries.