1106-05-1491 **Alex Lombardi*** (alexlombardi01@college.harvard.edu). *Distinguishing extension numbers for $\mathbf{R}^n$ and S^n.*

Let G be a group acting on a set X. The distinguishing number $D_G(X)$ is the smallest k such that there exists a k-coloring $c : X \to \{1, .., k\}$ which distinguishes the action of G on X (the only element of G that fixes c is the identity). Fixing $k = D_G(X)$, a subset $W \subset X$ with trivial pointwise stabilizer satisfies the precoloring extension property $P(W)$ if every k-coloring of $X - W$ can be extended to a G-distinguishing k-coloring of X. The distinguishing extension number $ext_D(X, G)$ is then defined to be the minimum n such that for all applicable $W \subset X$, $|W| \geq n$ implies that $P(W)$ holds. We compute $ext_D(X, G)$ in two particular instances: when $X = S^1$ is the unit circle and $G = \mathrm{Isom}(S^1) = O(2)$, and when $X = V(C_n)$ is the set of vertices of the cycle of order n and $G = \mathrm{Aut}(C_n) = D_n$. This resolves two conjectures of Ferrara, Gethner, Hartke, Stolee, and Wenger. In the case of $X = \mathbf{R}^2$, we prove that $ext_D(\mathbf{R}^2, SE(2)) < \infty$, which is consistent with (but does not resolve) another conjecture of Ferrara et al. We also prove that for all $n \geq 3$, $ext_D(S^{n-1}, O(n)) = \infty$ and $ext_D(\mathbf{R}^n, E(n)) = \infty$, disproving two other conjectures from the same authors. (Received September 13, 2014)