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Sewings of crumpled cubes, revisited

This talk will describe three mismatch properties, strictly ordered in strength, about sewings of crumpled n-cubes (i.e., compact subsets of S^n bounded by wildly embedded $(n-1)$-spheres). The strongest is a sufficient but not a necessary condition for a sewing to yield S^n; the weakest is a necessary but not sufficient one; and the intermediate property is neither necessary nor sufficient. We examine ancillary conditions under which these weaker mismatch properties imply the sewing yields S^n, showing the weakest property does when both crumpled cubes satisfy the Disjoint Disks Property; similarly, the intermediate property does provided at least one of the crumpled cubes possesses the Disjoint Disks Property. In addition, we develop examples that confirm sharpness of the relevant Disjoint Disks conditions. As a final result connecting these concepts, a crumpled n-cube C, $n > 4$, has the Disjoint Disks Property iff the Identity sewing $Id : BdC \to BdC$ of C to itself yields S^n iff that Identity sewing satisfies the intermediate mismatch property.