Arbitrarily long factorizations in mapping class groups

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Abstract

On a compact oriented surface of genus g with $n \geq 1$ boundary components, $\delta_1, \delta_2, \ldots, \delta_n$, we consider positive factorizations of the boundary multitwist $t_{\delta_1} t_{\delta_2} \ldots t_{\delta_n}$, where t_{δ_i} is the positive Dehn twist about the boundary δ_i. We prove that for $g \geq 3$, the boundary multitwist $t_{\delta_1} t_{\delta_2}$ can be written as a product of arbitrarily large number of positive Dehn twists about nonseparating simple closed curves. This fact has immediate corollaries on the Euler characteristics of the Stein fillings of contact three manifolds.