

# Complexity of Virtual Multistrings

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**Abstract.** A virtual  $n$ -string  $\alpha$  is a collection of  $n$  closed curves on an oriented surface  $M$ . Associated to  $\alpha$ , there are two natural measures of complexity: the genus of  $M$  and the number of intersection points. By considering virtual  $n$ -strings up to equivalence by virtual homotopy, i.e., homotopies of the component curves and stabilizations/destabilizations of the surface, a natural question is whether these quantities can be minimized simultaneously. We show that this is possible for non-parallel virtual  $n$ -strings and that, moreover, such a representative can be obtained by monotonically decreasing genus and the number of intersections from any initial representative.