

Weighted seaweed braids

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Abstract. We continue the algorithmic study of the seaweed monoid (the 0-Hecke monoid of the symmetric group), which has proved to be of fundamental importance for string comparison algorithms. The standard (unweighted) seaweed monoid is parameterised by a natural number n , and consists of $n!$ elements, represented by algebraic objects known as *seaweed braids*. Multiplication of two n -strand seaweed braids results in another n -strand seaweed braid. Such multiplication can be performed in time $O(n \log n)$, and can be used to provide efficient algorithms for various problems on strings and graphs. We consider a generalisation of the seaweed monoid, where each strand of a seaweed braid is assigned a real positive weight. The concept of seaweed braid product can be generalised in a natural way to weighted braids; however, a product of two n -strand weighted seaweed braids may, in general, have more than n weighted strands. We attempt to determine which algebraic and algorithmic properties of unweighted seaweed braids are preserved in the weighted case, and how these properties can be used for problems on weighted strings motivated by biological applications.

References

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