

# Dyck path formulas for type $A$ cluster monomials

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It is an important problem to explicitly construct good bases in cluster algebras, that is, bases having positive structure constants, containing the cluster monomials, etc. There currently exists a formula for the cluster variables of cluster algebras associated to type  $A$  quivers in terms of  $T$ -paths, which has been modified and generalized to cluster algebras coming from surfaces. We give a new (and more compact) combinatorial formula for all cluster monomials of the cluster algebra associated to any type  $A$  quiver, in terms of compatible subpaths on maximal Dyck paths. This formula has the potential to generalize to cluster algebras beyond the ones coming strictly from surfaces.

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