

1116-VA-1276 **Colby Long*** (celong2@ncsu.edu). *Initial Ideals of Phylogenetic Secant Ideals.*

The ideal of phylogenetic invariants of a phylogenetic mixture model of trees with the same topology is a secant variety. It has been shown that the Hilbert Series of the ideal of the binary Jukes-Cantor model of an n -leaf tree is independent of the tree topology. We show that for trees with six or fewer leaves the same result holds for secants of these ideals and conjecture that this is true for all n .

We also study a class of binomial initial ideals of $I_{2,n}$, the ideal of the Grassmannian $\mathbf{Gr}(2, \mathbb{C}^n)$, which are associated to phylogenetic trees. For a weight vector ω in the Tropical Grassmanian $in_\omega(I_{2,n}) = J_{\mathcal{T}}$ is the ideal associated to the tree \mathcal{T} . The ideal generated by the $2r \times 2r$ Pfaffians of a symmetric matrix is precisely $I_{2,n}^{\{r\}}$, the r -th secant variety of $I_{2,n}$. We prove necessary and sufficient conditions on the topology of \mathcal{T} in order for $in_\omega(I_{2,n}^{\{2\}}) = J_{\mathcal{T}}^{\{2\}}$. We also give a new class of prime initial ideals of the Pfaffian ideals. (Received September 18, 2015)