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**Huajun Huang** and **Luke Oeding\*** (oeding@auburn.edu). *Symmetrization of Principal Minors and Cycle Sums.*

We solve the Symmetrized Principal Minor Assignment Problem, that is we show how to determine if for a given vector  $v \in \mathbb{C}^n$  there is an  $n \times n$  matrix that has all  $i \times i$  principal minors equal to  $v_i$ . We use a special isomorphism (a non-linear change of coordinates to cycle-sums) that simplifies computation and reveals hidden structure. We use the symmetries that preserve symmetrized principal minors and cycle-sums to treat 3 cases: symmetric, skew-symmetric and general square matrices. We describe the matrices that have such symmetrized principal minors as well as the ideal of relations among symmetrized principal minors / cycle-sums. We also connect the resulting algebraic varieties of symmetrized principal minors to tangential and secant varieties, and Eulerian polynomials. (Received September 19, 2016)