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**Mark Ellingham\*** ([mark.ellingham@vanderbilt.edu](mailto:mark.ellingham@vanderbilt.edu)), **J. Zachary Gaslowitz** and **Ryan Solava**. *The structure of 4-connected  $K_{2,t}$ -minor-free graphs.*

Guoli Ding has provided a rough structure theorem for  $K_{2,t}$ -minor free graphs for all  $t$ . As a special case of his theorem, 4-connected  $K_{2,t}$ -minor-free graphs are obtained by attaching *strips*, consisting of two paths joined by edges with restricted crossings, to a finite set of base graphs. The first value of  $t$  where this applies in a nontrivial way is  $t = 5$ . We give a characterization of 4-connected  $K_{2,5}$ -minor-free graphs that shows that they can be obtained from a cyclic sequence of four types of subgraph. Consequently, we can derive a generating function and asymptotic estimate for the number of nonisomorphic 4-connected  $K_{2,5}$ -minor-free graphs of a given order. Our work extends to general  $t$  by providing a more precise description of the strips in Ding's result, suggesting a general asymptotic counting conjecture. (Received September 15, 2019)