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**Songling Shan\*** ([sshan12@ilstu.edu](mailto:sshan12@ilstu.edu)). *Hamiltonian cycles in tough  $(P_2 \cup P_3)$ -free graphs*. Preliminary report.

Let  $t > 0$  be a real number and  $G$  be a graph. We say  $G$  is  $t$ -tough if for every cutset  $S$  of  $G$ , the ratio of  $|S|$  to the number of components of  $G - S$  is at least  $t$ . Determining toughness is an NP-hard problem for arbitrary graphs. The Toughness Conjecture of Chvátal, stating that there exists a constant  $t_0$  such that every  $t_0$ -tough graph with at least three vertices is hamiltonian, is still open in general. A graph is called  $(P_2 \cup P_3)$ -free if it does not contain any induced subgraph isomorphic to  $P_2 \cup P_3$ , the union of two vertex-disjoint paths of order 2 and 3, respectively. In this paper, we show that every 15-tough  $(P_2 \cup P_3)$ -free graph with at least three vertices is hamiltonian. (Received January 22, 2019)