1122-20-19 **Z. Mesyan*** (zmesyan@uccs.edu), Department of Mathematics, University of Colorado, Colorado Springs, CO 80918, and **J. D. Mitchell**, **M. Morayne** and **Y. H. Péresse**. *Topological Graph Inverse Semigroups.*

To every directed graph $E$ one can associate a *graph inverse semigroup* $G(E)$, where elements roughly correspond to possible paths in $E$. These semigroups generalize polycyclic monoids, and they arise in the study of various rings and $C^*$-algebras. We investigate topologies that turn $G(E)$ into a topological semigroup. For instance, we show that in any such topology that is Hausdorff, $G(E) \setminus \{0\}$ must be discrete for any directed graph $E$. On the other hand, $G(E)$ need not be discrete in a Hausdorff semigroup topology, and for certain graphs $E$, $G(E)$ admits a $T_1$ semigroup topology in which $G(E) \setminus \{0\}$ is not discrete. We also describe, in various situations, the algebraic structure and possible cardinality of the closure of $G(E)$ in larger topological semigroups. (Received July 05, 2016)