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**Jeremy T Brazas\*** (jtv5@unh.edu), 4 Forest Street, Newmarket, NH 03857. *The fundamental group as topological group.*

Recently, P. Fabel and J. Brazas have independently shown that viewing the fundamental group  $\pi_1(X)$  as the quotient space of the loop space  $\Omega X$  with the compact-open topology does not always give rise to a topological group. We use free topological groups to introduce a new group topology on the fundamental group. The resulting invariant  $\pi_1^\tau$  takes values in the category of topological groups and is useful for studying homotopy in spaces that lack universal covers. This choice of topology allows us to prove topological analogues of classical results, which do not hold with the quotient topology. The preservation of products and a topological van Kampen theorem illustrate the potential for computation. Additionally, we realize an arbitrary topological group  $G$  as the fundamental group  $\pi_1^\tau(Y)$  of a space  $Y$  obtained by attaching 2-cells to a "non-discrete wedge" of circles  $\Sigma(X_+)$ . (Received September 20, 2010)