



# Timothy Brown

**Morgan State University**

**The Stone-Čech Compactification of a Discrete Space**

[tibro26@morgan.edu](mailto:tibro26@morgan.edu)

Let  $D$  be a set with discrete topology  $\mathcal{P}(D)$ . Let  $\beta D$  be the set of all ultrafilters on  $D$  and let  $e: D \rightarrow \beta D$  where  $e(x)$  is the principal ultrafilter generated by  $x \in D$ . We define a topology  $\tau$  on  $\beta D$  and prove the following theorem:

**Theorem:**  $(e, \beta D)$  is a Stone-Čech compactification of  $D$ .

The Stone-Čech compactification is important because it allows us to produce new results. For instance, suppose we are given any set  $Y$  which is not a compact Hausdorff space. We can look for a compact Hausdorff space  $T$  which is very similar to  $Y$ . That is, there is a homeomorphism  $h$  going from  $Y$  into a subspace  $h(Y)$  of the compact Hausdorff  $T$ . Now we can use results in  $T$  and translate it back to  $Y$ .

This is joint work with Dr. Arthur D. Grainger of Morgan State University.