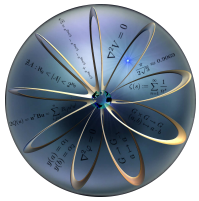

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## relatively prime integer topology

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Let $X$ be the set of strictly positive integers. The *relatively prime integer topology* on $X$ is the topology determined by a basis consisting of the sets

$$U(a,b) = \{ax + b \mid x \in X\}$$

for any $a$ and $b$ are relatively prime integers. That this does indeed form a basis is found in `http://planetmath.org/HausdorffSpaceNotCompletelyHausdorff`this entry.

Equipped with this topology, $X$ is `http://planetmath.org/T0Space`$T_0$, `http://planetmath.org/T1Space`$T_1$,and `http://planetmath.org/T2Space`$T_2$, but satisfies none of the higher separation axioms (and hence meet very few compactness criteria).

We can define a coarser topology on $X$ by considering the subbasis of the above basis consisting of all $U(a,b)$ with $a$ being a prime. This is called the *prime integer topology* on $\mathbb{Z}^+$.

# References

[1] L.A. Steen, J.A.Seebach, Jr., *Counterexamples in topology*, Holt, Rinehart and Winston, Inc., 1970.