

This note, that [was found here](#), as a part of [a collection](#) is written (completely with human hands) by [Rupadarshi Ray](#), was created on December 12, 2025 11:28:36 PM, was last modified on September 2, 2026 11:00:04 AM, and was exported on September 7, 2026 3:04:02 PM.

$$\prod_{i \in \mathbb{N}} \{1, \dots, n_i\}$$

Proposition: Let $n_i \geq 1$ and consider

$$\prod_{i \in \mathbb{N}} \{1, \dots, n_i\}$$

(with product of discrete topology). Then this space is **compact, nonempty, metrizable and totally disconnected**.

- If for infinitely many i , $n_i > 1$ then the space is perfect.

Let

$$X := \prod_{i \in \mathbb{N}} \frac{1}{n_i - 1} \{0, \dots, n_i - 1\}$$

- It is nonempty because $(0, 0, \dots) \in X$.
- Consider the metric

Proposition: The function

$$d : [0, 1]^{\mathbb{Z}_{>0}} \times [0, 1]^{\mathbb{Z}_{>0}} \rightarrow [0, \infty)$$
$$d(x, y) := \sup \left\{ \frac{|x_n - y_n|}{n} \mid n \geq 1 \right\}$$

defines a metric.

...

[1]

Current note has 0 direct children and 0 total descendants.

- [stretchy](#)
 - $\prod_{i \in \mathbb{N}} \{1, \dots, n_i\}$

And it has 62 siblings.

- [stretchy](#)
 - [Trefoil \$3_1\$ knot](#)
 - [The only compact connected Lie group that can act faithfully on a torus is itself](#)
 - [Hecke algebras](#)
 - $\overline{B^n}$
 - $\text{BS}(1, 2)$
 - $(\mathbb{C}, +, \times)$
 - $D^* := D \setminus \{0\}$
 - [Cantor set](#)
 - [Configuration space of \$N\$ rigid points in \$\mathbb{R}^3\$](#)
 - [Free groups](#)
 - $GL(2)(\mathbb{Z}) \curvearrowright T^2$
 - H_2^3
 - $[a, b]$
 - [Figure 8 knot](#)
 - [Lamplighter group on \$\mathbb{Z}_2\$](#)
 - $\beta\mathbb{N}$
 - $\#_2\mathbb{R}P^2$
 - $\prod_{i \in \mathbb{N}} \{1, \dots, n_i\}$
 - $\mathbb{R}P^n$
 - $(\mathbb{Q}, +, \times, <)$
 - $\mathbb{Q}_{\hat{p}}$
 - $\overline{\mathbb{Q}}$
 - $\mathbb{Q}_{\text{constr}}$
 - $\mathbb{Q}(\xi_n)$
 - $\mathcal{O}_{\overline{\mathbb{Q}}}$
 - $(\mathbb{R}, +, \times, <, \sup)$
 - [Homeomorphism of \$\mathbb{R}^2\$ that sends \$\mathbb{N}\$ to a countable closed discrete subset](#)
 - $\mathbb{R}^2 \times S^1$
 - $\mathbb{R}^n$
 - $\mathbb{R} \times S^1$
 - $\mathbb{R} \times S^2$
 - S^1
 - $S^1 \wedge S^1$
 - $S^1 \times S^n$
 - S^2 [and](#) $\mathbb{C}P^1$
 - [Mapping torus of the antipodal map of \$S^2\$](#)
 - S^3
 - S^n
 - [I-bundle](#)

- Symmetric group
- $\mathbb{I}$
- T^2
- T_g^2
- $T_{0,0,3}^2$
- $\mathbb{R}^2 \setminus \{0\}$
- Three $T_{1,0,1}^2$ -glued at their boundaries
- $T_{1,1,0}^2$
- T_2^2
- $T_g^2 \times [0, 1]$
- $\#_{\mathbb{N}} T^2$
- Thompson's group
- T^n
- 3-valent tree
- 4-valent tree
- $[0, 1]^{\mathbb{N}}$ with product topology
- Whitehead manifolds
- $\mathbb{Z}$
- $\mathbb{Z}[\sqrt{m}]$
- $\mathbb{Z}[X]$
- $\mathbb{Z}^{\mathbb{N}}$
- $\mathbb{Z}[i]$
- $\mathbb{Z}[i\sqrt{5}]$