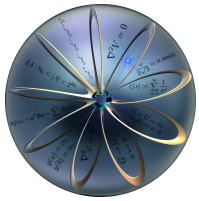

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line segment

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Defines	open line segment
Defines	closed line segment

Definition Suppose V is a vector space over $\mathbb{R}$ or $\mathbb{C}$, and L is a subset of V. Then L is a *line segment* if L can be parametrized as

$$L = \{a + tb \mid t \in [0, 1]\}$$

for some a, b in V with $b \neq 0$.

Sometimes one needs to distinguish between open and `http://planetmath.org/Closed`closed line segments. Then one defines a *closed line segment* as above, and an *open line segment* as a subset L that can be parametrized as

$$L = \{a + tb \mid t \in (0, 1)\}$$

for some a, b in V with $b \neq 0$.

If x and y are two vectors in V and $x \neq y$, then we denote by $[x, y]$ the set connecting x and y. This is , $\{\alpha x + (1 - \alpha)y \mid 0 \leq \alpha \leq 1\}$. One can easily check that $[x, y]$ is a closed line segment.

Remarks

- An alternative, equivalent, definition is as follows: A (closed) line segment is a convex hull of two distinct points.
- A line segment is connected, non-empty set.
- If V is a topological vector space, then a closed line segment is a closed set in V. However, an open line segment is an open set in V if and only if V is one-dimensional.
- More generally than above, the concept of a line segment can be defined in an ordered geometry.