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# symmetric set

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**Definition** A subset $A$ of a group $G$ is said to be *symmetric* if $A = A^{-1}$, where $A^{-1} = \{a^{-1} : a \in A\}$. In other , $A$ is symmetric if $a^{-1} \in A$ whenever $a \in A$.

If $A$ is a subset of a vector space, then $A$ is said to be *symmetric* if it is symmetric with respect to the additive group structure of the vector space; that is, if $A = \{-a : a \in A\}$ [**?**].

### 0.0.1 Examples

1. In $\mathbb{R}$, examples of symmetric sets are intervals of the type $(-k, k)$ with $k > 0$, and the sets $\mathbb{Z}$ and $\{-1, 1\}$.

2. Any vector subspace in a vector space is a symmetric set.

3. If $A$ is any subset of a group, then $A \cap A^{-1}$ and $A \cup A^{-1}$ are symmetric sets.

# References

[1] R. Cristescu, *Topological vector spaces*, Noordhoff International Publishing, 1977.

[2] W. Rudin, *Functional Analysis*, McGraw-Hill Book Company, 1973.