



A *proper cone* is a <http://planetmath.org/Cone3> cone  $C \subset \mathbb{R}^n$  that satisfies the following:

- $C$  is convex;
- $C$  is closed;
- $C$  is solid, meaning it has nonempty interior;
- $C$  is pointed, meaning  $x, -x \in C \Rightarrow x = 0$ .

A proper cone  $C$  induces a partial ordering on  $\mathbb{R}^n$ :

$$a \preceq b \Leftrightarrow b - a \in C.$$

This ordering has many nice properties, such as transitivity, reflexivity, and antisymmetry.

## References

- [1] S. Boyd, L. Vandenberghe, *Convex Optimization*, Cambridge University Press, 2004.