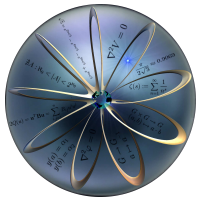

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Borel subalgebra

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Let $\mathfrak{g}$ be a semi-simple Lie group, $\mathfrak{h}$ a Cartan subalgebra, R the associated root system, and $R^+ \subset R$ a set of positive roots. We have a root decomposition into the Cartan subalgebra and the root spaces $\mathfrak{g}_\alpha$

$$\mathfrak{g} = \mathfrak{h} \oplus \left(\bigoplus_{\alpha \in R} \mathfrak{g}_\alpha \right).$$

Now let $\mathfrak{b}$ be the direct sum of the Cartan subalgebra and the positive root spaces.

$$\mathfrak{b} = \mathfrak{h} \oplus \left(\bigoplus_{\beta \in R^+} \mathfrak{g}_\beta \right).$$

This is called a *Borel subalgebra*.