

What I know

A lie group is a group that satisfies the 3 manifold axioms (a group that's also a manifold). Each element of the group can be written as:

$$R(\theta) = e^{i \vec{J} \cdot \vec{\theta}}$$

where $\vec{J}$ is discrete and is a generator of the group. Infinitesimally, elements of this group can be written as:

$$R(\delta\theta) \approx 1 + i \vec{J} \cdot \delta\vec{\theta}$$

The generators are (almost always?) discrete and obey a certain relationship.

This relationship is called a Lie algebra. An example is:

$$[J_x, J_y] = i\hbar J_z, \dots, \text{etc}$$

$$[J_i, J_j] = i\hbar \epsilon_{ijk} J_k$$