# Goldman@G&T: Affine Structures

November-15-13 2:06 PM

Affine structure: Flat torsion-free affine connection.
Euclidean structure: Flat Riemannian metrics.

In the first case, $G$ is $\mathrm{Aff}(\mathbb{R}^n) = \mathbb{R}^n \rtimes GL(n,\mathbb{R})$ ← Preserves a notion of "parallelism".

second —"— is $\mathrm{Isom}(\mathbb{R}^n) = \mathbb{R}^n \rtimes O(n)$

---

$\mathbb{R}^n \setminus \{0\} / x \sim 2x$ is a geodesically-incomplete affine manifold.

↕ uniform motion does not extend to all times.

$\cong S^{n-1} \times S^1$, geodesics that aim at the origin loop around faster and faster.

Geodesically complete ⇒ by "development", universal cover is homeomorphic to $\mathbb{R}^n$.