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$\mathbb{R}$ -hyperbolic space $\mathbb{R}H^n$

[#wiki/Man/R/metric/Riem](#)

[#wiki/Man/R/n](#)

The *unique* simply connected Riemannian manifold of dimension n with constant sectional curvature -1

$$\mathbb{R}H^n$$

- isometries
- connection
- geodesics
- exponential map

low dimensions

dim	upper half	Poincare ball	Hyperboloid model	Isom. _o
2	$\mathbb{R}H^2$			$PSL(2)(\mathbb{R}) \cong PSU(1,1,\mathbb{C})$
3				$PSL(2)(\mathbb{C})$
4				
5				

Current note has 5 direct children and 5 total descendants.

- [squishy](#)
 - $\mathbb{R}H^n$
 - [Hyperbolic ball model](#)
 - [Conic neighborhood](#)
 - [Hyperboloid model of \$\mathbb{R}H^n\$](#)
 - [Hyperboloid model to ball model of \$\mathbb{R}H^n\$](#)
 - [Types of isometries of \$\mathbb{R}\$ -hyperbolic space](#)

And it has 30 siblings.

- [squishy](#)
 - $SL(2)(\mathbb{R}) \curvearrowright \mathbb{R}^2$
 - $SL(2)(\mathbb{R}) \curvearrowright H^2_{\mathbb{U}}$
 - $\text{Mat}_{\mathbb{C}}(2)$
 - $A_{r,\cdot} \langle z \mapsto \lambda z \rangle \setminus \mathbb{R}H^2_{\mathbb{U}}$
 - $\mathbb{C} \setminus \{0\}, \cdot \langle z \mapsto z+1 \rangle \setminus \mathbb{R}H^2_{\mathbb{U}}$
 - $\mathbb{C} \setminus \{0,1\}, \cdot \text{-}PSL(2)(\mathbb{Z})[2] \setminus \mathbb{R}H^2_{\mathbb{U}}$
 - $\mathbb{R} \ltimes_{\theta} \mathbb{C}^2$
 - $\boldsymbol{CI}(\mathbb{R}^n, \langle \cdot, \cdot \rangle_{0,n})$
 - $\mathbb{C}^n$
 - $U(\mathbb{C} \setminus \{0\})$
 - $PSL(2)(\mathbb{C}) \curvearrowright \mathbb{C}P^1 \cong_{\text{Man}} S^2$
 - $\mathbb{C}P^n$
 - [Farey_graph_complex and tree](#)
 - GL
 - [Heisenberg.group](#)
 - [Incomplete hyperbolic polygon mod side-pairing](#)
 - $\mathbb{R}H^2, \mathbb{R}H^2_{\mathbb{U}}, D^2$
 - $\mathbb{R}H^n$
 - D_n [lattice](#)
 - [Matrices](#)
 - $\text{Mat}_{\mathbb{R}}(2)$
 - [Mobius endomorphisms](#)
 - [Elementary_group with finite and infinite sided Dirichlet polyhedra](#)
 - [Polynomials](#)
 - $T^*S^1 \not\cong_{\text{Sym}} (\mathbb{R}^2 \setminus \{0\}, dx \wedge dy)$
 - $Z \left(\sum_{1 \leq j \leq n} z_j^2 - 1 \right) (\mathbb{C}) \cong_{\text{Sym}} T^*S^{n-1}$
 - SL
 - SO
 - [Seifert–Weber dodecahedral 3-manifold](#)
 - $U(n, \mathbb{C})$