Branch Invariance

Overcoming

62

- Branch invariance is highly non-linear. Orthogonality is insufficient!

- Instead continuous, non-linear mappings on Poincaré Ball

- Approximate this class with **deep neural networks** with parameters

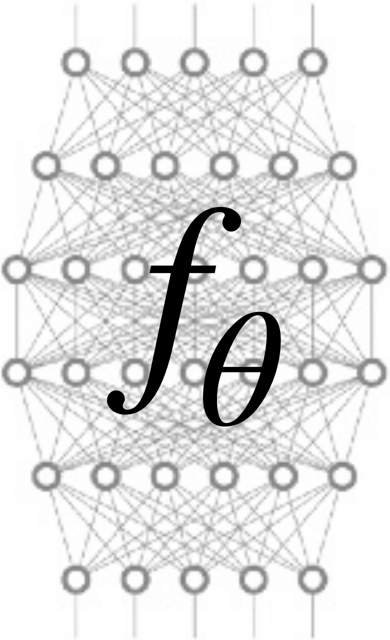
- But these need to be defined over the hyperbolic manifold!

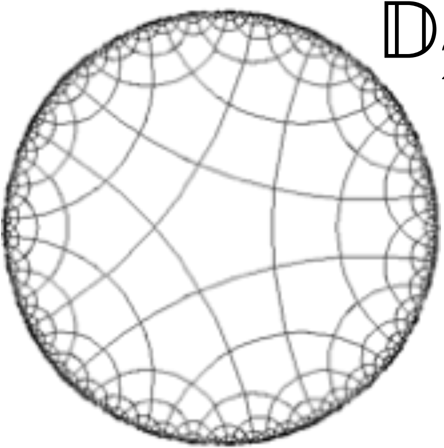
$$\mathscr{F} = \{\mathbf{P} : \mathbf{P}^\top \mathbf{P} = \mathbf{I}, \mathbf{P}\mathbf{P}^\top = \mathbf{I}\}$$

$$\mathscr{F} = \{f : \mathbb{D} \to \mathbb{D} \ : f \in \mathscr{C}(\mathbb{D})\}$$

$$f_\theta$$

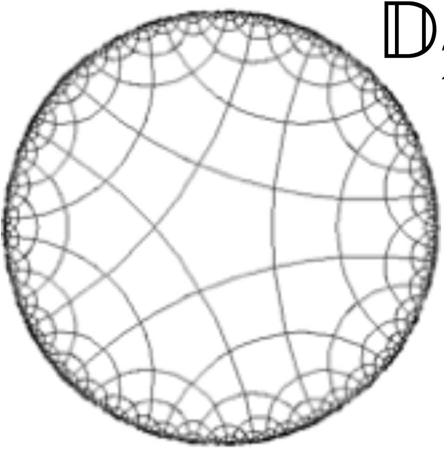
$$\theta \in \Theta$$


f_θ



$\mathbb{D}_2$

f



$\mathbb{D}_2$

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Branch Invariance

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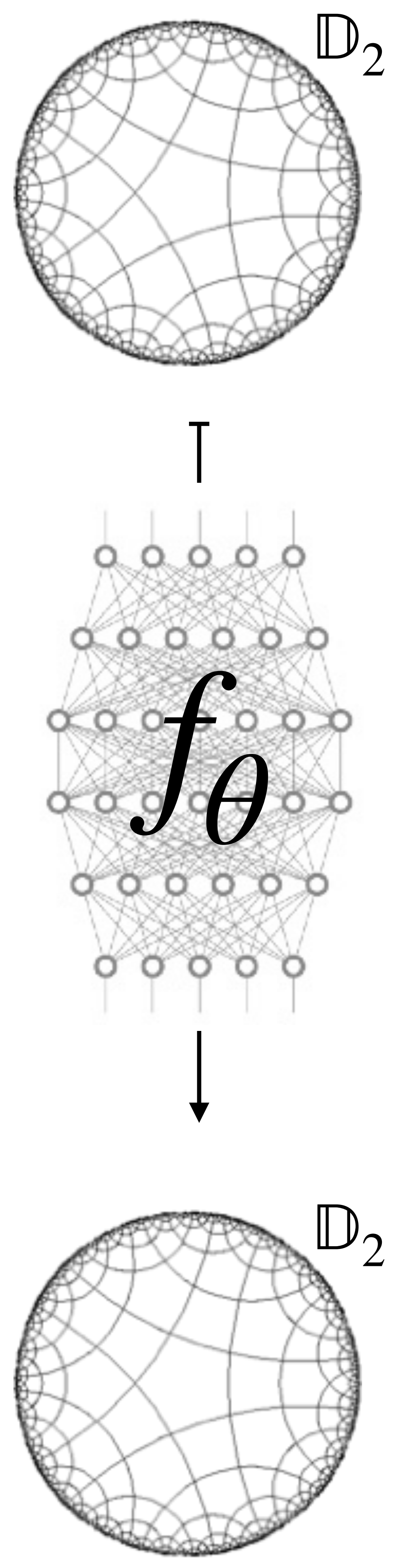

Hyperbolic Neural Networks
Building Blocks