Geometry Motivation

Intersecting spectral and ℓ_∞ implicit biases (Hadamard as an ideal)

Spectral geometry
(maximal update)

ℓ_∞ geometry
(maximal update)

Scaled
Hadamard
Ideal

Muon

Lion

Orthogonalize
(polar / Newton–Schulz)

Sign on
(momentum direction)
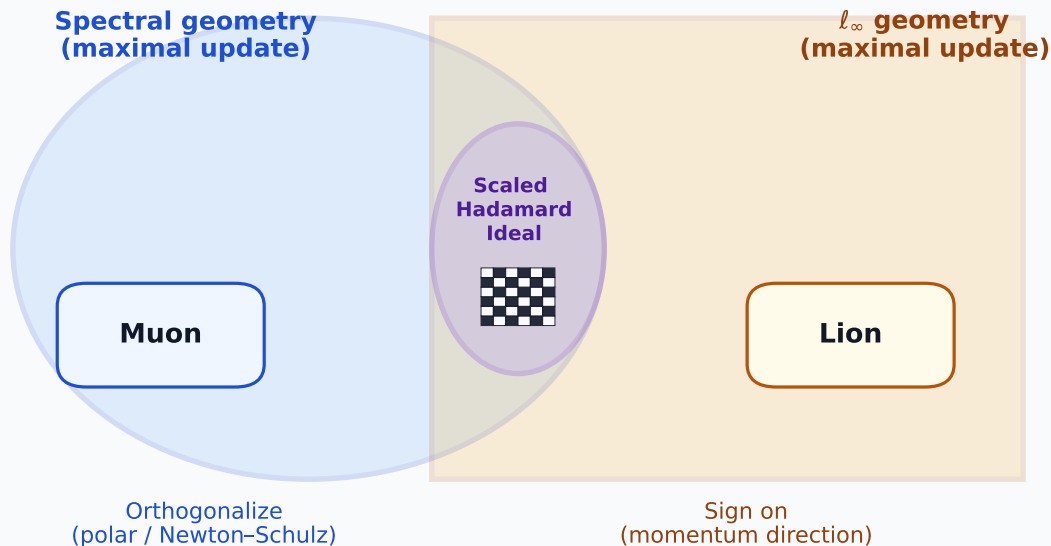
Goal: combine both biases for matrix weights by approximating the intersection
(Hadamard as an idealized reference, not a guaranteed target).