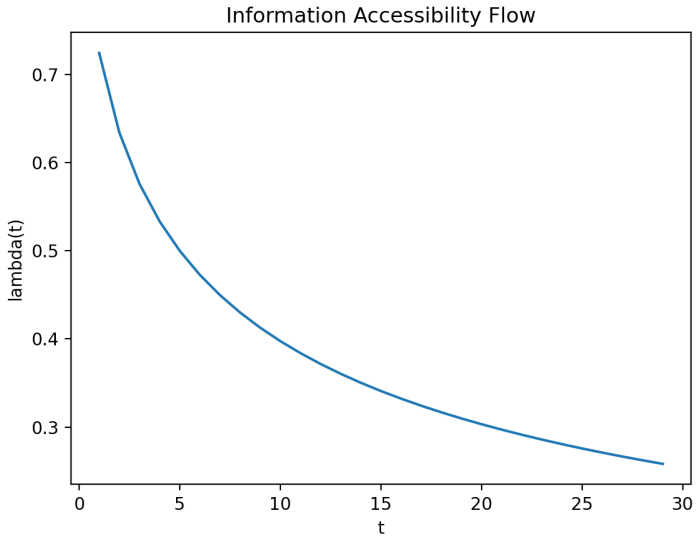
Kaelion 4.0 Toy Model: Emergent AdS2 Geometry from Information Accessibility

We present a minimal toy model demonstrating that an AdS2 geometry emerges as an output of an information-theoretic renormalization flow. The construction relies solely on the existence of an information accessibility parameter lambda obeying a universal RG flow.

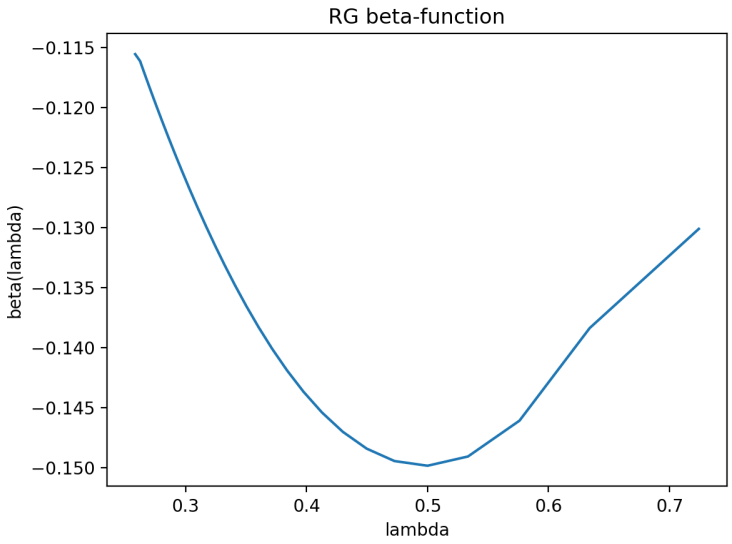
Toy Model and Definition of lambda

We consider a scrambling quantum system and define the information accessibility lambda(t) as the average fraction of operator support remaining accessible to a local observer.



RG Flow and Emergent Coordinate

The RG equation d lambda / d ln t = -c lambda(1-lambda) admits the solution lambda(t) = 1/(1+(t/t*)^c). Defining the emergent coordinate z = -k ln lambda, the RG flow becomes a translation in z at large scales.



Theorem (Emergent AdS2 Geometry)

Imposing invariance of the effective metric under RG translations uniquely yields a hyperbolic metric equivalent to Euclidean AdS2. The AdS geometry is therefore an output of the information accessibility flow.

Corollary (Reduction to Kaelion v3.0)

Evaluating observables at RG fixed points recovers the Kaelion v3.0 entropy correction alpha = -1/2 - lambda, with integrable and chaotic limits corresponding to lambda = 0 and 1.