fn accuracy_to_discrete_laplacian_scale

Michael Shoemate

July 22, 2025

This document contains materials associated with accuracy_to_discrete_laplacian_scale. By discrete_laplacian_scale_to_accuracy, the relationship between α , a and scale, is:

$$\alpha = 2\frac{e^{(1-a)/s}}{e^{1/s} + 1}$$

A closed-form expression for s doesn't exist, so we use a numerical approach by a binary search. A loose upper bound is provided by accuracy_to_laplacian_scale.

The binary search finds the smallest s such that

$$\alpha \le 2\frac{e^{(1-a)/s}}{e^{1/s} + 1}$$