

The Riemann Field (ABF v5.0): Analytic–Beyond Fusion

Concept + Illustrative Plots

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Abstract

We package a compact ABF v5.0 scaffold: (i) a concept diagram linking weighted NB/BD stability to an information-balance layer, and (ii) a small illustrative regression on $\log \log N$ vs. $\log \text{MSE}^*$. This is heuristic documentation, not a proof of RH.

1 Analytic core (NB/BD + weighted Hilbert)

Let $a_n = \mu(n) v(n/N) q(n)$ with $v \in C_0^\infty(0, 1)$ and slowly varying q . With the kernel

$$K_{mn} = e^{-\frac{1}{2}|\log(m/n)|} = \min\{\sqrt{m/n}, \sqrt{n/m}\},$$

a band-sum argument and Möbius cancellation yield a decay of off-diagonals

$$\sum_{m \neq n} a_m a_n K_{mn} \leq C(\log N)^{-\theta} \sum_n a_n^2, \quad \theta > 0,$$

stabilizing the NB/BD normal equations.

2 Beyond layer (design \rightarrow observed error)

Design choices (window width σ , ridge λ , boundary weights w_\pm) alter the empirical split (MSE_+ , MSE_- , MSE^*). The parameters (η, θ) serve as *balance surrogates*: η for arithmetic cancellation, θ for residual off-diagonal decay.

3 Illustrative toy fit

We show a small toy regression of $\log \log N$ vs. $\log \text{MSE}^*$; the goal is to demonstrate how to reproduce comparative plots. Replace with real CSV in production.

Reproducibility. The figure-generating code is provided in this package; swap in your CSV to regenerate.

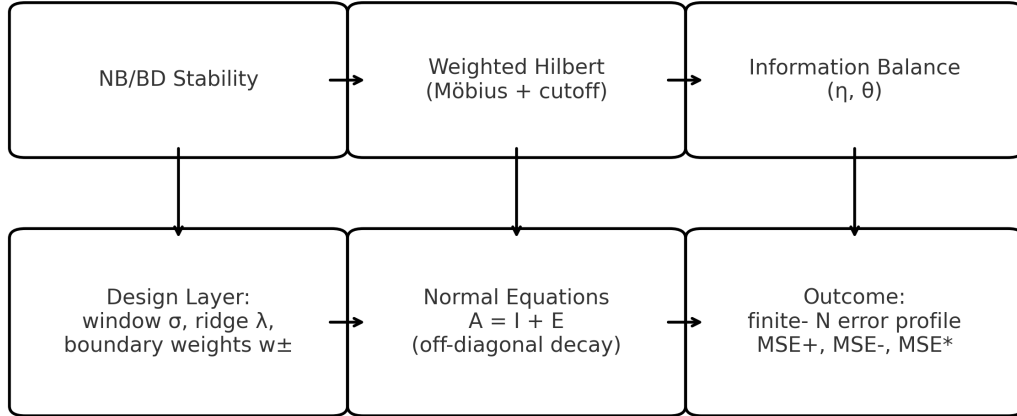


Figure 1: ABF v5.0 concept map: NB/BD stability \Rightarrow decay in off-diagonals; design layer modulates the observed error profile.

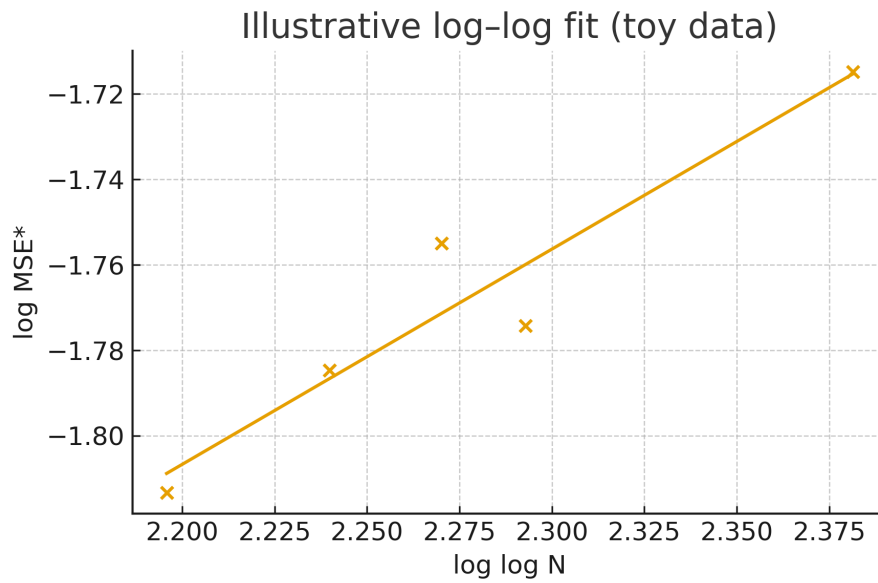


Figure 2: Illustrative log-log OLS on toy data. Slope/intercept are for demonstration only.