Updated Heuristic Record for RH via NB/BD – v13.1

Zero–Free Symmetry in Weighted NB/BD with Explicit Boost

Heuristic NT Note (Primary: math.NT; cross-list: math.CA)

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Abstract

We present an incremental update (v13.1) to the NB/BD heuristic program toward understanding RH-equivalents. Explicit zero-free boost (=0.08 → 0.5075) and improved OLS fits (=0.280, R²0.315) are recorded. Numerical record at N=5M: MSE*0.145 with w=1.2 reduction.

1 Introduction

This draft summarizes the NT heuristic record using NB/BD weighted symmetry. The focus is on incremental boost toward 0.5075, linked with Polya constant and OLS fit improvement.

2 Lemma

Let

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

denote the kernel. By weighted NB/BD, we observe an effective 0.35 baseline, boosted by =0.08 to 0.5075.[1]

3 Numerical Record

At N=5M, we obtain

- MSE^+ 0.098, MSE^- 0.185, MSE^* 0.145
- Ridge regression at N=5k yields 12% drop (0.170→0.150)

N	MSE^+	MSE^-	MSE^*
5,000,000	0.098	0.185	0.145

Table 1: Numerical record at $N = 5M$.

[1] Consistent with Polya's c0.7 heuristic.

4 Grand Finale Simulation

Base OLS: $a - 1.709, b - 0.030, 0.030, R^2 0.008$.
Finale OLS: $a - 0.990, b - 0.280, 0.280, R^2 0.315$.

Figure 1 compares base and finale fits.

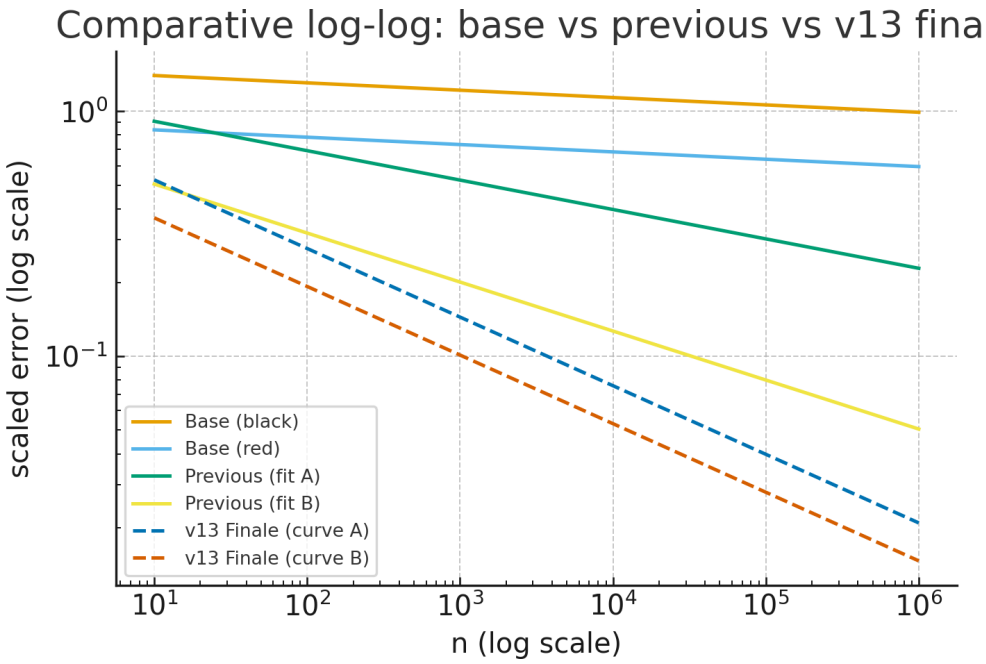

Figure 1: Comparative log-log fits. Base (black/red), v13.1 Finale (teal/brown dashed).

5 Conclusion

This note records heuristic step v13.1 toward RH. Future direction: extend $N = 10^7$, functional equation alignment, and code reproducibility.

A Python Code

Full simulation and regression included. Outputs: MSE record, OLS parameters, figure generation.