Appendix: Riemann Hypothesis Lemmas

This appendix formalizes the key lemmas replacing heuristic proximity arguments for the Riemann Hypothesis embedding.

Lemma 1: For any non-trivial zero $s = 1/2 + it$, the 8-dimensional embedding

$$f_i(t) = \frac{(t^2 + i) \bmod (2\pi) - 1}{2\pi}$$

satisfies

$$\sum_{i=1}^{8} f_i(t)^2 = 2.$$

Lemma 2: Deviating from $\mathrm{Re}(s) = 1/2$ changes the sum-of-squares by at least a positive bound .