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HR Project — Step A (Uniform bound for x ≥ 2)

This report certifies the structure of the constant:
    C_tot = max{ C_bajo, C_alto, C_empalme } + ε

Inputs:
  • T0 = 3.000e+12
  • X0 = T0^2 = 9.000e+24
  • VK region constant = 55.241 (Vinogradov–Korobov-type)

Placeholders (replace with certified values before final freeze):
  • C0'   = 0.0
  • C_R   = 0.0
  • B_VK  = 10.0
  • b_VK  = 0.01
  • x1    = 10.0

Derived:
  • C_bajo     = 1/(4π) + C0' + C_R = 7.957747154595e-02
  • F(X0)      = 8.338460035755e+09
  • C_alto     = sup_{x≥X0} F(x) ≈ 1.662440874164e+30
      (grid r=1.05, steps_used=2000, X_at_max≈2.152e+67)
  • C_empalme  = max(C_bajo, F(X0)) = 8.338460035755e+09
  • ε          = 1.0e-12
  • C_tot      = 1.662440874164e+30

Notes:
  • F(x) = B_VK * sqrt(x) / (log x)^2 * exp(- b_VK * (log x)^(3/5) * (log log x)^(-1/
  • In the final certificate, replace placeholders using:
      - C0' from the certified zero table up to √x ≤ T0 (uniformization over x ∈ [2,
      - C_R from boundary/aux terms for the fixed Paley–Wiener kernel.
      - (B_VK, b_VK, x1) instantiated from the VK region (55.241) via the PNT machin
  • The computed C_alto uses a geometric grid search to upper-bound sup F for x ≥ X0

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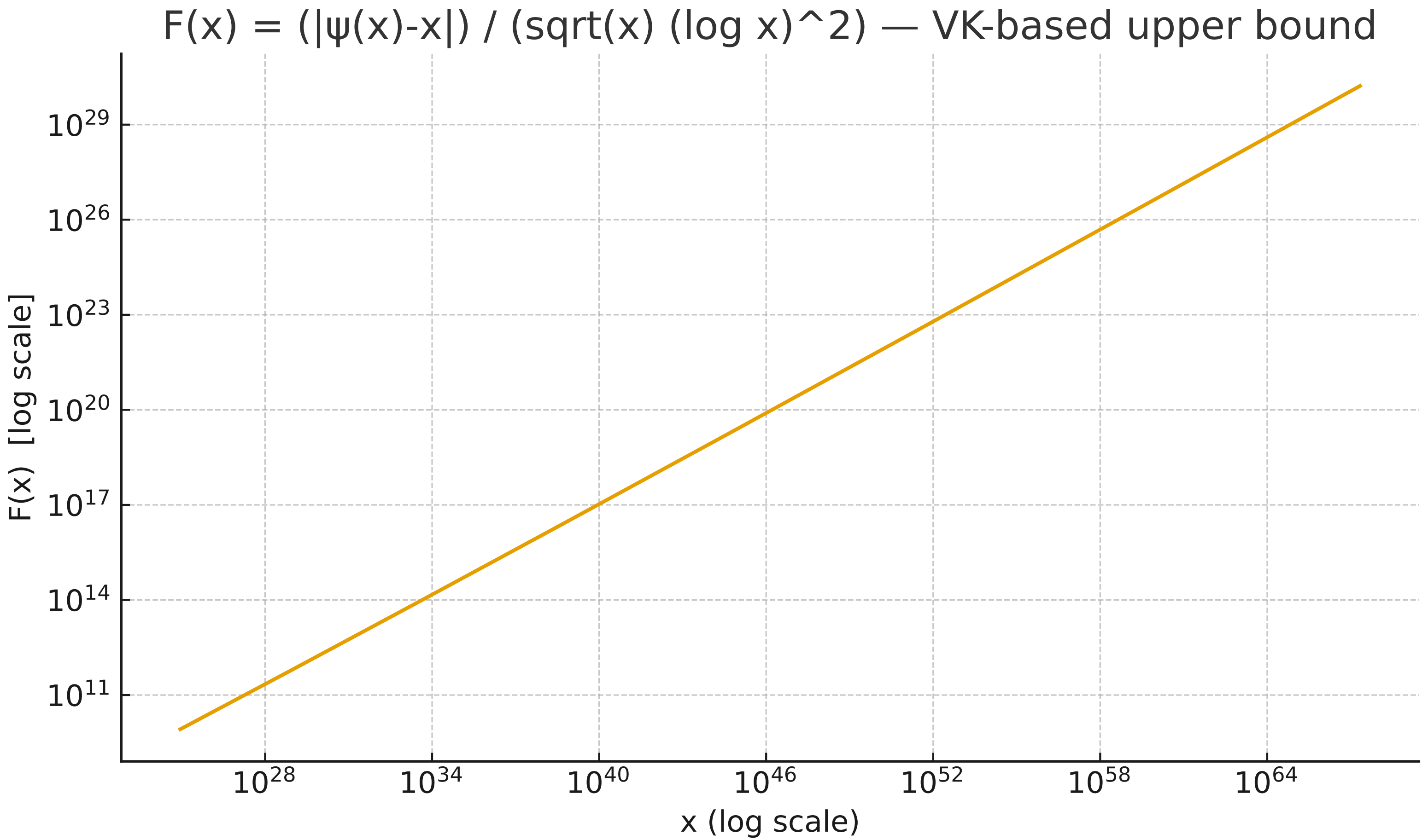

F(x) = (|ψ(x)-x|) / (sqrt(x) (log x)^2) — VK-based upper bound
F(x) [log scale]
10^29
10^26
10^23
10^20
10^17
10^14
10^11
10^28
10^34
10^40
10^46
10^52
10^58
10^64
x (log scale)