

Explicit SM Embedding — RS Toy Construction (ASCII-safe)

Minimal explicit embedding (Randall-Sundrum-type brane):

- 5D warped metric: $ds^2 = e^{-2k|y|} g_{\mu\nu} dx^\mu dx^\nu + dy^2$.
- Brane tension λ ; 5D curvature scale k ; 5D Planck M_5 .
- 4D Newton: $8\pi G = \kappa_5^4 * \lambda / 6$ (schematic mapping).
- SMS projection -> effective 4D: $G_{\mu\nu} + \Lambda_4 g_{\mu\nu} = (8\pi G)T_{\mu\nu} + (\kappa_5^4)\Pi_{\mu\nu} - E_{\mu\nu}$.
- Modified Friedmann (flat): $H^2 = (8\pi G/3) \rho (1+\rho/2\lambda) + \Lambda_4/3 + C/a^4$.

Anomaly & Yukawa sketch:

- Gauge: $SU(3) \times SU(2) \times U(1)$ on the brane; zero-mode fermions from bulk fields with boundary conditions.
- Anomalies: $\sum Y = 0$, $\sum Y^3 = 0$, $\sum Y \text{Tr}(T_a T_b) = 0$ satisfied by SM assignments per generation.
- Hierarchies via localization: lepton/baryon fields have bulk masses $c_i k$; overlaps with brane Higgs give Yukawas.
- Radion stabilization (e.g., Goldberger-Wise) maintains k , λ against runaways.