The Four-Regulator Commitment-Maintenance Execution and Physical-Admission No-Go Theorem in VERSF

A complete candidate calculation of W_prim, G_red, D35 weights, scalar response, Yukawa support, chiral embeddings, charged tensors and branch free energies.

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Designation: HCMR-MR1 · Complete Multi-Regulator Candidate Execution / Exact Physical-Certificate Refusal

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COMPLETE CANDIDATE EXECUTION — PHYSICAL CERTIFICATE REFUSED. Four nested regulators pass positivity and second-order convergence; the exact conjugate branch pair, the non-selective P_Y, the independent CY3′ failure and the absent completion residue block physical admission.

Audit item	Verdict	Meaning
Four-regulator execution	**PASS**	Levels 3, 4, 5, 6 executed from one frozen source stack.
W_prim and history Schur reduction	**PASS**	Residual 6.94×10^{-18}; six positive eigenvalues.
Full H_CMR candidate and G_red	**PASS as construction**	102-dimensional parent; 96 nonterminal; 87 retained after nine auxiliaries.
D35 gauge weights	**RETURNED for candidate**	Reduced weights (1, 5/2, 298); physical ledger provenance conditional.
Scalar response	**PASS as dimensionless return**	$v/\Lambda \to 0.074969837$ with second-order convergence.
P_Y	**SUPPORT PASS / SELECTION FAIL**	Rank 9 on both sides; $\lVert P\_Y - I \rVert \approx 10^{-15}$.
Chiral embeddings	**PASS as construction**	Isometric full-carrier selectors and stable address embeddings.
Charged tensors	**PASS as candidate**	Stable three-sector hierarchies and CKM frame.
Internal CY3′	**PASS**	Functorial routes agree at 1.7×10^{-14}.
Independent CY3′	**FAIL**	Stable residues 0.37–0.49.
Branch selection	**FAIL for uniqueness**	Global k = 0; nonzero class {1, 6} exactly degenerate.

Audit item	Verdict	Meaning
K_comp, Z_comp and Λ★	**OPEN**	No completion kinetic residue is returned.
Physical HFB admission	**REFUSED**	Uniqueness and provenance gates fail despite convergence.

General reader summary

This paper performs the calculation requested after ASAC-1: it executes the strongest available commitment-maintenance candidate at four nested regulator levels and computes the primitive history metric, the relaxed response, D35 weights, scalar and completion response, Yukawa support, chiral embeddings, charged tensors and branch free energies. The calculation is complete as a candidate execution, and it is independently rechecked from the exported arrays and hashes.

The numerical behaviour is excellent. Every nonterminal block is positive, the full 87-dimensional relaxed response is positive, the charged hierarchies and mixing frame stabilise, and the successive regulator differences fall by almost exactly a factor of four — the signature of second-order convergence, not numerical accident.

The result nevertheless does not produce the uniquely selected physical branch that the requested theorem presupposed. The unrestricted Gaussian free energy selects the trivial k = 0 sector. If the programme-level primitive-Fact condition excludes k = 0, the two nonzero orientations k = 1 and k = 6 remain exactly degenerate at every regulator. The calculation therefore selects a *conjugate branch class*, not an oriented branch.

Two further failures are decisive. The returned Yukawa projector P_Y has full rank and is numerically the identity, so it certifies support but does not select a physical readout subspace. And while two functorially related charged routes agree at about 10^{-14}, the genuinely independent completion-derivative and closure-Hessian routes disagree by 0.37–0.49. Regulator stability confirms the candidate is well defined; it does not make the candidate physical.

The correct inference is not that the regulators rescued the theory, nor that the theory failed numerically. It is that **numerical non-convergence is no longer the blocker**. What remains is structural, and it is now cleanly isolated from numerical noise.

Contents

Abstract

We execute the strongest available representation-resolved commitment-maintenance candidate at four nested regulators $n = 3, 4, 5, 6$. The retained parent has the census $12 + 6 + 18 + 36 + 24 + 6 = 102$. Its six terminal record directions are exact zero modes, while the 96-dimensional

nonterminal parent is positive with minimum eigenvalue 0.036330823885. Eliminating six history-bath and three gauge-auxiliary directions gives an 87-dimensional G_red with minimum eigenvalue 0.040590799480. The discrete $K = 7$ history branch reproduces entropy production ln 2 and returns W_prim with eigenvalues (0.040590799480, 0.041077733874, 0.121772398439, 0.155865285073, 0.255522504163, 0.324726395838).

The D35 gauge parent returns direct weights (6, 13/2, 378), relaxation weights (5, 4, 80) and reduced weights (1, 5/2, 298). The scalar response converges to $v/\Lambda = 0.074969836626$ and $\mu_H^2/\Lambda^2 = 8.029252005 \times 10^{-4}$. The support projectors P_Y^L and P_Y^R have rank nine and differ from the identity only at floating-point level. Level-6 charged singular values are $u = (7.2176 \times 10^{-6}, 3.7051 \times 10^{-3}, 0.971991)$, $d = (1.5638 \times 10^{-5}, 3.12765 \times 10^{-4}, 1.61957 \times 10^{-2})$, $e = (2.99175 \times 10^{-6}, 6.19677 \times 10^{-4}, 1.06961 \times 10^{-2})$, with $J_{CKM} = -1.84456 \times 10^{-5}$.

Successive regulator differences exhibit order $p \approx 2$ for H_full, G_red, the completion resolvent, scalar response, charged singular values and CKM modulus. Nevertheless, the full Gaussian free energy selects $k = 0$. Conditional on excluding the identity sector, the exact conjugate pair $k = \pm 1$ survives with zero splitting at all four regulators. The functorial charged CY3′ residual is $\approx 10^{-14}$, but the independent mixed-versus-Hessian test remains 0.37–0.49 and is regulator stable. The full W_prim cross-block provenance, a nontrivial P_Y selector, and Z_comp are not returned. We therefore prove a **physical-admission no-go** for this candidate: regulator convergence establishes a stable mathematical construction, not a uniquely selected physical H_CMR branch.

Part I — Execution contract and source freeze

1. Question, grade and non-insertion boundary

The requested target was a uniquely selected physical H_CMR branch whose multi-regulator execution would return W_prim, G_red, D35 weights, scalar response, P_Y, chiral embeddings, charged tensors and branch free energies. The present source corpus does not supply a unique oriented physical branch *before* the run. HCMR-MR1 therefore freezes the strongest available candidate and its full conjugate branch class, executes every requested consumer, and treats uniqueness itself as an admission **test** rather than an assumption.

Claim-grade firewall. HCMR-MR1 proves a complete four-regulator execution of the strongest available candidate and an exact physical-admission refusal. It does **not** prove that the candidate direct-sum parent, representation ledger, P_Y selector, action normalisation or branch orientation is uniquely forced by the primitive MASD/HMGBC substrate.

No measured Standard Model mass, coupling, mixing angle or CP phase is read by the calculation. The source stack consists of frozen $K = 7$ history arrays, four RCMO regulator returns, the representation ledger and the pre-frozen QCD scalar bridge. Every file is hashed before execution. Comparison with independent routes occurs only *after* the candidate arrays exist.

2. Four-regulator source hierarchy

Level	Nominal spacing	Frozen source	Objects consumed
3	2^{-3}	MHPE frozen RCMO return	H_physical, M_Ω,normalised, slot_response
4	2^{-4}	MHPE frozen RCMO return	H_physical, M_Ω,normalised, slot_response
5	2^{-5}	FCHI extended RCMO return	H_physical, M_Ω,normalised, slot_response
6	2^{-6}	FCHI extended RCMO return	H_physical, M_Ω,normalised, slot_response

Levels 3 and 4 are the original MHPE regulators; levels 5 and 6 extend the *same* RCMO blocking law using the FCHI source package. They are nested refinements, not separately tuned schemes. The decisive test is therefore whether the same typed objects approach a regulator limit with a stable branch class and stable rank.

3. Full-carrier census and candidate assembly

Block	Dimension rule	Real dimension
History defects + zero-mean bath	6 + 6	12
Gauge direct + auxiliary response	3 × 2	6
Generation-address completion	9 complex, realified	18
Charged left–right parent	2 × 9 complex, realified	36
Neutral Nambu parent	2 × 6 complex, realified	24
Completed neutral records	3 complex, realified	6
Total		**102**

H_full^(n,k) = H_hist ⊕ H_gauge ⊕ H_comp^(n,k) ⊕ H_ch^(n) ⊕ H_ν^(n,k) ⊕ 0_record. **(1)**

Equation (1) is the strongest retained-order parent currently executable from the frozen packages. Its six completed-record directions are exact terminal zeros. The direct-sum form is a **construction**, not a proof that every microscopic cross-block vanishes. This distinction is load-bearing: positivity and convergence of a direct-sum candidate do not establish physical W_prim provenance.

Part II — History metric, D35 and relaxed response

4. One-bit K = 7 history return

The archived discrete-Fold law is rebuilt from the frozen reference kernel and six defect generators. Solving the one-bit condition returns $\alpha = 0.959001109719975$ and entropy production $\Sigma = 0.693147180559946 = \ln 2$ per declared Fold. This is the reproducible D36 convention; no continuous-rate reinterpretation is used here.

K_α(y|x) = T_0(y|x) exp[α F_C(x,y)] ⁄ Σ_z T_0(z|x) exp[α F_C(x,z)]. **(2)**

5. W_prim and the exact history Schur theorem

W_prim = W_defect − C^T A_Q^{-1} C. **(3)**

The six zero-mean state-function scores are eliminated by the Schur complement. The independent verifier reconstructs (3) from the exported W_defect, A_Q and C arrays with spectral residual 6.94×10^{-18}.

	C	**J**	**T**	**R**	**B**	**H**
C	0.290485	−0.021943	6.73×10^{-20}	2.44×10^{-18}	-4.46×10^{-18}	−0.076801
J	−0.021943	0.078717	6.44×10^{-18}	8.87×10^{-19}	-1.13×10^{-17}	−0.049217
T	6.73×10^{-20}	6.44×10^{-18}	0.081182	-1.52×10^{-17}	0.040591	-1.66×10^{-18}
R	2.44×10^{-18}	8.87×10^{-19}	-1.52×10^{-17}	0.255523	-1.37×10^{-17}	-2.77×10^{-19}
B	-4.46×10^{-18}	-1.13×10^{-17}	0.040591	-1.37×10^{-17}	0.081182	-1.96×10^{-18}
H	−0.076801	−0.049217	-1.66×10^{-18}	-2.77×10^{-19}	-1.96×10^{-18}	0.152467

spec(W_prim) = (0.040590799, 0.041077734, 0.121772398, 0.155865285, 0.255522504, 0.324726396). **(4)**

The matrix has visible block structure: the {C, J, H} sector is coupled, the {T, B} pair is coupled through the off-diagonal 0.040591, and R is decoupled from everything at the 10^{-17} level (so 0.255523 appears directly in the spectrum). The T/B block [[0.081182, 0.040591], [0.040591, 0.081182]] has eigenvalues 0.081182 ± 0.040591, contributing the smallest eigenvalue 0.040591 and the value 0.121772.

Theorem 1 (exact history reduction). The frozen one-bit K = 7 path law returns a positive six-dimensional W_prim. Its smallest eigenvalue is 0.040590799480 and the independent Schur reconstruction residual is below 7×10^{-18}. This is an exact candidate-level pass, not a proof that the K = 7 support exhausts the physical full-carrier score law.

6. Gauge D35 ledger

Factor	Direct d_A	Cross b_A	Auxiliary r_A	Reduced Z_A
colour	6.000	5.000	5.000	1.000
weak	6.500	4.000	4.000	2.500
q	378.000	80.000	80.000	298.000

$H_A = [[d_A, r_A], [r_A, r_A]]$, $Z_A = d_A - r_A$, **(5)**

$G_{red,gauge} = \mathrm{diag}(1, 5/2, 298)$. **(6)**

Equation (5) is the exact 2×2 Schur complement: eliminating the auxiliary gives $d_A - r_A \cdot r_A^{-1} \cdot r_A = d_A - r_A$, verified for all three factors. The colour parent block has eigenvalues (0.475062189, 10.524937811), giving the quoted gauge-parent minimum eigenvalue 0.475062189440.

On the conventional $q = 6Y$ basis the candidate couplings follow a single closed form,

$g_A = c_A / \sqrt{Z_A}$, $c = (1, 1, 6)$, **(6′)**

so that $g_s = 1/\sqrt{1} = 1$ exactly, $g = 1/\sqrt{(5/2)} = \sqrt{(2/5)} = 0.632455532034$ exactly, and $g' = 6/\sqrt{298} = 0.347570667818$. These are readouts of the executed representation ledger, **not** promoted physical boundary values, and no mixing-angle comparison is performed anywhere in this paper.

D35 grade. The D35 weights and cross-blocks are complete for the executed representation-resolved candidate. They remain conditional because the primitive substrate has not yet uniquely forced the representation ledger, bath adjacency, or absolute action normalisation.

7. Full 102-dimensional parent and 87-dimensional G_red

The terminal six-dimensional record block is retained as an exact zero sector, so the nonterminal parent has dimension 96. Six history-bath coordinates and three gauge auxiliaries are eliminated, leaving 87 retained coordinates:

$G_{red}^{(n,k)} = H_{rr}^{(n,k)} - H_{r\eta}^{(n,k)} [H_{\eta\eta}^{(n,k)}]^{-1} H_{\eta r}^{(n,k)}$. **(7)**

Object	Dimension	Status
H_full	102	six terminal record zeros
H_nonterminal	96	strictly positive
Auxiliary census	9	six history bath + three gauge auxiliary
G_red	87	strictly positive

At every level and on both conjugate branches, the nonterminal minimum eigenvalue is 0.036330823885 and the reduced minimum eigenvalue is 0.040590799480. The independent full Schur reconstruction residual is 3.47×10^{-18} at all four levels. The exact zero minimum of the 102-dimensional matrix is entirely the declared terminal record block.

Lemma 7.1 (the softest reduced direction is a history direction). The minimum eigenvalue of the 87-dimensional G_red (0.040590799479812) coincides with the minimum eigenvalue of the six-dimensional W_prim (0.040590799479811) to twelve significant figures — a one-ulp difference. The softest mode of the entire relaxed response is therefore the T/B history direction of §5, not a gauge, completion, charged or neutral direction. Two consequences follow. First, the positivity margin of the whole 87-dimensional construction is inherited from the history block, so any future revision of W_prim propagates directly to the global positivity claim. Second, the coincidence is a useful invariant: a physical cross-block completion of (1) that left this equality intact would be evidence that the added cross-blocks are soft in the history sector, while any shift would localise where the direct-sum assumption first fails.

Figure 1. Minimum eigenvalues of every executed block and of the full reduced response, levels 3–6. The terminal record zeros are omitted from the plotted nonterminal positivity test.

Part III — Completion and scalar response

8. Completion operator

$\Delta\_comp^{(n,k)} = \Delta\_gen^{(n,k)} \otimes I_3 + I_3 \otimes H\_addr^{(n)} + \gamma\, \Delta\_gen^{(n,k)} \otimes H\_addr^{(n)}$, **(8)**

$R\_comp^{(n,k)} = [w\_H\, I_9 + \Delta\_comp^{(n,k)}]^{-1}\, w\_H\, I_9$. **(9)**

The history metric fixes w_H = 0.152467118931 (the H-diagonal entry of W_prim) and γ = 0.536860288277. The generation operator carries the signed $\mathbb{Z}_7$ branch, while H_addr and the terminal record operator are loaded independently at each regulator. The construction is positive at all levels.

9. Scalar return and convergence

Level	mean Tr(R)/9	v/Λ	μ_H²/Λ²	ω × step
3	0.276350654	0.075098664	$8.056870381 \times 10^{-4}$	0.390470382
4	0.275596354	0.074996103	$8.034879133 \times 10^{-4}$	0.390470382
5	0.275441955	0.074975092	$8.030377686 \times 10^{-4}$	0.390470382
6	0.275403344	0.074969837	$8.029252005 \times 10^{-4}$	0.390470382

The level-6 return is $v/\Lambda = 0.074969836626$ and $\mu\_H^2/\Lambda^2 = 8.029252005 \times 10^{-4}$. The last successive relative change in v/Λ is 7.009×10^{-5}, and the order inferred from the last three levels is $p = 1.99938$.

Because the order is established, the limit itself can be estimated rather than merely bounded. Richardson extrapolation at $p = 2$,

$(v/\Lambda)\_\infty \approx (v/\Lambda)_6 + [(v/\Lambda)_6 - (v/\Lambda)_5] / (2^2 - 1) = 0.074968085$, **(9′)**

places the regulator limit about 1.75×10^{-6} below the level-6 value — a 2.3×10^{-5} relative correction. This is reported as a construction-internal limit estimate and inherits every conditional grade attached to the candidate.

10. Why Λ★ remains open

The scalar calculation returns dimensionless response ratios. It does not return the momentum derivative of the completion kernel. The physical completion scale requires two separate same-action objects:

$Z\_comp = [dK\_comp(p^2)/dp^2]\_\{p^2=0\}$, $\Lambda\star = \sqrt{K\_comp / Z\_comp}$. **(10)**

No Z_comp array exists in the source stack or in this execution. Setting Z_comp = 1 would be *identity completion*, not a derived result. HCMR-MR1 therefore does not release an absolute Λ★ even though the scalar ratios converge — consistent with ASAC-1's Theorem 5, which proved the completion-scale definition non-identifying until K_comp and Z_comp are independent outputs of the same reduced Hessian.

Part IV — P_Y, chiral embeddings and charged tensors

11. Yukawa support projector

$P\_Y^L = \mathrm{supp}(T\_ch\ T\_ch^\dagger)$, $P\_Y^R = \mathrm{supp}(T\_ch^\dagger\ T\_ch)$. **(11)**

Level	rank P_L	rank P_R	idempotency residual	‖P_L − I₉‖
3	9	9	1.246×10^{-15}	1.246×10^{-15}
4	9	9	1.014×10^{-15}	1.014×10^{-15}
5	9	9	9.896×10^{-16}	9.896×10^{-16}
6	9	9	1.103×10^{-15}	1.103×10^{-15}

Theorem 2 (support without selection). At all four regulators the charged tensor is full rank, so $P\_Y^L = P\_Y^R = I_9$ up to numerical precision. The projector is stable and mathematically valid, but it does not select a nontrivial Yukawa subspace. A full-support projector cannot serve as the missing microscopic readout theorem.

The failure is informative rather than merely negative: rank stability across four regulators shows the fullness is a property of the candidate construction, not a regulator artefact that finer blocking might remove. A nontrivial P_Y must therefore come from new structure, not from further refinement.

12. Chiral embeddings

The address embeddings are obtained by normalising the frozen six-slot response vectors and lifting them into generation-address space. Full-carrier selectors then embed u_L, u_R, d_L, d_R, e_L, e_R, ν_L and N_R into the 102-dimensional carrier. Every exported selector is an isometry to machine precision; the maximum level-6 address-isometry residual is 3.85×10^{-16}:

$E\_fL^\dagger E\_fL = I_3$, $E\_fR^\dagger E\_fR = I_3$. **(12)**

The embeddings are internally well typed. Their physical provenance remains conditional on the representation ledger and completion attaching map: isometry is a necessary typing condition, not a proof that the substrate uniquely chose the embedding.

13. Charged tensors and CKM frame

$Y\_f^{(n)} = E\_fL^{(n)\dagger} H\_full^{(n)} E\_fR^{(n)}$, $f \in \{u, d, e\}$. **(13)**

The full-carrier extraction reproduces the separately calculated charged tensors with zero floating-point residual at every level. Level-6 singular values:

Sector	**σ_1**	**σ_2**	**σ_3**	**condition number**
u	$7.217613783 \times 10^{-6}$	0.003705068	0.971990996	1.3467×10^{5}
d	$1.563816320 \times 10^{-5}$	$3.127654649 \times 10^{-4}$	0.016195715	1.0357×10^{3}
e	$2.991750333 \times 10^{-6}$	$6.196773765 \times 10^{-4}$	0.010696107	3.5752×10^{3}

Figure 2. Charged singular values at levels 3–6. The hierarchies are stable and successive relative changes approach second order.

The level-6 charged left-frame mismatch gives the CKM-modulus candidate:

	d	**s**	**b**
u	0.974796069	0.223062860	0.003947640
c	0.223014521	0.973981453	0.040306978

	d	s	b
t	0.006094798	0.040038603	0.999179545

The corresponding Jarlskog candidate is J_CKM = $-1.844557640110 \times 10^{-5}$, the unitarity residual is 4.067×10^{-16}, and the charged determinant phase is -1.165×10^{-21}. These are candidate branch outputs, compared with no observed mixing target in this paper.

14. Functorial CAR and internal CY3′

The exterior-algebra lift is internally exact: the level-6 CAR residual is 7.226×10^{-18}, the Fock functorial residual is 1.157×10^{-17}, and the charged parent minimum eigenvalue is 1.028009003782.

Sector	internal CY3′ residue
u	2.6157×10^{-16}
d	1.7117×10^{-14}
e	1.2370×10^{-14}

These small residues prove that the two charged constructions used inside RRHF are faithful lifts of the *same* parent tensor. They do not prove that the parent tensor itself is the physical one.

Part V — Independent provenance and branch selection

15. Independent CY3′ falsifier

Sector	independent mixed-vs-Hessian residue	Verdict
u	0.373851	FAIL
d	0.381211	FAIL
e	0.493033	FAIL
ν	0.448473	FAIL

Figure 3. The internally functorial RRHF routes agree to machine precision (10^{-14}–10^{-16}), while the independently typed MHPE completion-derivative and closure-Hessian routes disagree at order 0.4 — a gap of about thirteen orders of magnitude between the two kinds of test.

Theorem 3 (independent route obstruction). A compatibility test between two algebraic lifts of one parent can certify implementation fidelity but cannot certify parent provenance. The independent CY3′ residues remain between 0.37 and 0.49 at all regulators. Therefore the candidate charged and neutral bilinears do not descend consistently from one independently differentiated master action.

The regulator stability of the failure is what makes it decisive. A residue that shrank with refinement would indicate a discretisation error; a residue flat at O(0.4) across a $2^{-3} \to 2^{-6}$ refinement is a structural disagreement between two definitions of the same object.

16. Branch free energies

$F\_k^{(n)} = ½ \log \det H\_nonterminal^{(n,k)}$. **(14)**

The determinant is positive at every regulator and branch, so the free-energy comparison is well defined inside the Gaussian candidate. Level 6:

k	F_k − min F	completion contribution	neutral contribution
0	0	−3.792261	8.304444
1	0.016578444	−3.777915	8.306678
2	0.053453117	−3.746035	8.311672
3	0.082767408	−3.720813	8.315764
4	0.082767408	−3.720813	8.315764
5	0.053453117	−3.746035	8.311672
6	0.016578444	−3.777915	8.306678

Figure 4. Branch free-energy ordering. The unrestricted minimum is k = 0. Conditional on excluding the identity sector, k = 1 and k = 6 form the exact lowest nonzero class.

17. Exact conjugate-pair theorem

At every regulator the free energies obey F_k = F_(−k mod 7) **exactly** (verified residual 0 for all k = 1,…,6, not merely at tolerance). The independent verifier also finds zero spectral difference between the k = 1 and k = 6 full parents. The unrestricted minimum is k = 0; the zero-to-nonzero level-6 gap is 0.016578443532; and conditional on primitive-Fact nonidentity, the next gap above the {1, 6} class is $F_2 − F_1 = 0.036874673124$.

Theorem 4 (branch-class selection, not branch selection). The four-regulator Gaussian action selects the identity sector globally. If k = 0 is excluded by an upstream primitive-Fact theorem, the surviving minimum is the exact conjugate class {+1, −1}. No oriented physical branch is selected. The degeneracy may not be broken using CKM, PMNS or observed CP data.

Corollary 4.1 (why the degeneracy is structural). The exactness of F_k = F_(7−k) — zero, not 10^{-16} — shows the tie is a symmetry of the constructed functional rather than a near-coincidence of its numerics. No refinement of the regulator, and no increase in precision, can lift it. Only an orientation-odd term in the action, or an equivalent primitive irreversible current, can break k ↔

−k. This is the same conclusion reached from the entropy-production side elsewhere in the programme, arrived at here independently through the Gaussian free energy.

Part VI — Regulator convergence and physical admission

18. Second-order convergence theorem

Levels	H_full	G_red	R_comp	v/Λ	‖V_CKM‖ max	Y_u singulars
3 → 4	6.1937×10^{-6}	8.2745×10^{-6}	0.0040	0.0014	0.0012	4.1313×10^{-4}
4 → 5	1.2108×10^{-6}	1.6176×10^{-6}	9.5808×10^{-4}	2.8016×10^{-4}	3.1112×10^{-4}	1.0358×10^{-4}
5 → 6	3.0306×10^{-7}	4.0487×10^{-7}	2.3960×10^{-4}	7.0091×10^{-5}	7.7744×10^{-5}	2.5913×10^{-5}

Object	Asymptotic order p
H_full	1.998301
G_red	1.998301
R_comp	1.999525
v/Λ	1.998935
‖V_CKM‖ max	2.000658
Y_u singulars	1.998972

The orders are computed from the **last two** differences, $p = \log_2(\delta_{4\to5} / \delta_{5\to6})$; all six reproduce to five decimals. The earlier pair $\delta_{3\to4} / \delta_{4\to5}$ gives noticeably higher apparent orders for several objects (H_full and G_red ≈ 2.35, v/Λ ≈ 2.32), which is the expected pre-asymptotic signature: the levels 3–4 differences still contain higher-order contamination, and the clean $p \approx 2$ regime is reached only at levels 5–6. Reporting the order from the last pair is therefore the correct choice, and the two-pair comparison is itself evidence that the asymptotic regime has been entered rather than assumed.

Theorem 5 (regulator convergence). Across levels 3–6, H_full, G_red, the completion resolvent, scalar response, charged singular values and CKM modulus converge at second order. Ranks, positivity and the nonzero branch class are stable. The candidate therefore has a genuine regulator limit inside its declared construction class.

Figure 5. Successive regulator differences. The last two refinements differ by almost exactly a factor of four, giving $p \approx 2$.

19. Stability is not correctness

Proposition 19.1 (convergence certifies the construction, not the selection). Let $\mathcal{C}$ be a construction depending on a regulator index n, and suppose $\mathcal{C}_n \to \mathcal{C}_\infty$ at order p with stable rank, positivity and branch class. These facts constrain only the map $n \mapsto \mathcal{C}_n$. They are invariant under replacing $\mathcal{C}$ by any other construction $\mathcal{C}'$ that shares the same regulator family. Therefore convergence data cannot distinguish $\mathcal{C}$ from $\mathcal{C}'$, and cannot certify that the substrate selected $\mathcal{C}$. Selection requires an object outside the regulator family — a derived cross-block, an orientation-odd term, a gapped readout projector, or an independently differentiated action.

HCMR-MR1 is a sharp instance. The candidate converges extremely well while, simultaneously, the independent CY3′ route is wrong by order one, P_Y remains the identity, and the branch orientation remains exactly degenerate. The correct inference is not that the regulators rescued the physical theory; it is that **numerical non-convergence is no longer the blocker**, and the remaining debts are structural and now isolated from numerical noise.

20. Physical-admission no-go theorem

Admission gate	Result
Candidate execution complete	PASS
Positive at all regulators	PASS
Charged tensors regulator stable	PASS
P_Y rank stable	PASS
Nonzero branch class stable	PASS
Unique oriented branch	**FAIL**
Physical W_prim provenance	**FAIL**
Independent CY3′ pass	**FAIL**
Z_comp returned	**FAIL**
HFB admitted	**FAIL**

Theorem 6 (HCMR-MR1 physical-admission no-go). Within the frozen strongest-candidate source class, all requested consumers are executable and regulator convergent. A physical H_CMR certificate nevertheless does not follow, because (i) the oriented branch is an exact conjugate pair; (ii) the full W_prim and representation-ledger provenance is conditional; (iii) P_Y is full-support and non-selective; (iv) the independent CY3′ theorem fails; and (v) Z_comp is absent. Consequently HFB-1 is **not admitted**.

Each of the five obstructions is independent: repairing any one alone leaves the certificate refused. (i) is a symmetry statement, (ii) a provenance statement, (iii) a rank statement, (iv) a descent statement, and (v) a missing-object statement — no two share a repair.

21. Named premises and falsifiers

Premise	Statement	Falsifier
P1	The direct-sum parent (1) is the strongest executable retained-order candidate from the frozen packages.	F1
P2	The frozen one-bit $K = 7$ law returns W_prim by the exact Schur reduction (3).	F2
P3	The representation-resolved gauge ledger gives $Z_A = d_A - r_A$ and the readouts (6′).	F3
P4	Levels 3–6 are nested refinements of one RCMO blocking law, not separately tuned schemes.	F4
P5	The Gaussian free energy (14) is the branch selector on the candidate.	F5
P6	Full-rank P_Y certifies support only, never physical readout selection.	F6
P7	Internal functorial agreement certifies implementation fidelity, never parent provenance.	F7
P8	No measured Standard Model observable is read anywhere in the execution.	F8

Falsifiers.

- **F1** — a stronger executable parent exists in the frozen class, or a required cross-block of (1) is shown nonzero, changing positivity or the branch ordering.
- **F2** — the Schur reconstruction (3) fails to reproduce the exported arrays within the declared tolerance, or W_prim loses positivity.
- **F3** — the gauge Schur complement is not $d_A - r_A$, or the readouts (6′) do not follow from the executed ledger.
- **F4** — levels 5–6 are shown to implement a different blocking law from levels 3–4, invalidating the convergence-order inference.
- **F5** — an orientation-odd action term or primitive irreversible current is derived, breaking $F_k = F_{(7-k)}$ and superseding Theorem 4.
- **F6** — a gapped, regulator-stable, non-identity P_Y is derived and fixed before any mass comparison, superseding Theorem 2.
- **F7** — the completion-derivative and closure-Hessian routes are made to descend from one master action and agree at the declared order, superseding Theorem 3.
- **F8** — any observed mass, coupling, mixing angle or CP phase is found to enter upstream of the candidate arrays.

22. Revised programme ledger and next returns

Remaining return	Release condition
Primitive full-carrier history law	Derive every block *and cross-block* of W_prim from one marked path law; zero cross-blocks must be calculated, not assumed.
Representation-ledger provenance	Prove the $K = 7$ substrate forces the charged and neutral ledger, including the neutral terminal extension.
Nontrivial P_Y	Derive a gapped, regulator-stable Yukawa readout projector that is not the identity and is fixed before mass comparison.

Remaining return	Release condition
Independent CY3′ closure	Make the completion derivative and closure Hessian descend from the same master action and agree at the declared order.
Orientation selector	Return an action-derived odd term or equivalent primitive current that breaks $k \leftrightarrow -k$ without target data.
Completion residue	Calculate K_comp(p^2) and Z_comp from the same reduced Hessian, releasing $\Lambda\bigstar$.
Whole-action regulator certificate	Repeat the complete calculation after those returns and require the same branch, rank, positivity and convergence properties.

The Step-4 status is therefore: **complete multi-regulator candidate execution; physical branch and HFB certificate open.** This is a stronger result than another conditional benchmark, because it closes the numerical-consumer question and proves exactly which provenance gates still prevent promotion.

Conclusion

HCMR-MR1 has executed the strongest available H_CMR candidate more deeply than any prior attempt. The full 102-dimensional carrier, the 87-dimensional relaxed response, D35 weights, scalar ratios, support projectors, embeddings, charged tensors and branch free energies have all been returned at four regulators and independently verified. The run is positive, reproducible and second-order convergent.

The central scientific conclusion is negative but decisive: the current corpus does not contain a uniquely selected physical H_CMR branch. The calculation prefers $k = 0$ unless nonidentity occupancy is imposed, and then leaves the exact conjugate pair $k = \pm 1$. P_Y is the identity, the independent CY3′ route fails, the physical cross-block provenance is absent, and the completion residue is unreturned. The physical certificate is therefore correctly refused.

Final scientific verdict. COMPLETE FOUR-REGULATOR CANDIDATE EXECUTION / EXACT PHYSICAL-ADMISSION REFUSAL. Numerical convergence is closed. Primitive provenance, nontrivial readout, oriented branch selection, independent action descent and completion normalisation remain open.

Appendix A — Numerical certificate

A.1 Level-6 principal returns

Field	Value
α_Fold	0.959001109719975
Σ	0.693147180559946
min eig W_prim	0.040590799479811
min eig H_nonterminal	0.036330823885362
min eig G_red	0.040590799479812
v/Λ	0.074969836626354
v/Λ, Richardson limit (p = 2)	0.074968085333
μ_H^2/Λ^2	$8.029252005403215 \times 10^{-4}$
J_CKM	$-1.844557640109599 \times 10^{-5}$
internal CY3′ max	$1.711723943440258 \times 10^{-14}$
independent CY3′ max	0.493033085023938
global branch	k = 0
conditional nonzero branch class	{1, 6} = {+1, −1}

A.2 Full level-6 CKM modulus

	d	s	b
u	0.974796069298	0.223062859789	0.003947640327
c	0.223014521313	0.973981453029	0.040306977548
t	0.006094798211	0.040038603097	0.999179545275

A.3 Level-6 branch ledger

k	F_k	$F\_k - F_0$	F_comp	F_neutral
0	16.519018984344	0	−3.792260519068	8.304444311950
1	16.535597427876	0.016578443532	−3.777915276022	8.306677512436
2	16.572472101000	0.053453116656	−3.746034706112	8.311671615649
3	16.601786392038	0.082767407693	−3.720812855849	8.315764056424
4	16.601786392038	0.082767407693	−3.720812855849	8.315764056424
5	16.572472101000	0.053453116656	−3.746034706112	8.311671615649
6	16.535597427876	0.016578443532	−3.777915276022	8.306677512436

Conjugate check: F_k − F_(7−k) = 0 exactly for every k = 1,…,6.

Appendix B — Independent verification

A separate verifier loads the exported arrays without importing the construction functions. It checks frozen and output hashes, reconstructs the history and gauge Schur complements, reconstructs the full 87-dimensional Schur reduction, re-extracts all charged tensors from the 102-dimensional embeddings, re-evaluates log determinants, tests branch conjugacy, checks support-projector rank and measures convergence order.

Verification item	Result
All frozen hashes	True
All pre-verification output hashes	True
History Schur residual	6.9389×10^{-18}
Gauge Schur residual	0
Full Schur residual, all levels	3.47×10^{-18}
Conjugacy residual, all levels	0
All positive nonterminal / G_red tests	True
Independent verifier overall	**PASS**

The verifier result is machine-readable in `results/independent_verification.json`. Passing this audit certifies reproducibility of the candidate calculation; it does not change the physical-admission grade. Per D36-R1's manifest protocol, hashes establish integrity, not currency — the frozen-input revision status is recorded separately in Appendix C.

Appendix C — Frozen input ledger

Frozen object	Level	SHA-256 prefix
K7_reference_kernel_T0.npy	—	1cca8f8762debab0…
R_QCD_mu0.npy	—	e0ba6d3d0036dbb4…
defect_generators_F.npy	—	368068f3b3e3d8f7…
level_3_H_physical.npy	3	2911510a93edd376…
level_3_M_Omega_normalised.npy	3	06e615f0d98a5217…
level_3_slot_response.npy	3	d01db4dbdc457a47…
level_4_H_physical.npy	4	ab71077761d34f82…
level_4_M_Omega_normalised.npy	4	66bb74216b67da6d…
level_4_slot_response.npy	4	811e299713170260…
level_5_H_physical.npy	5	baa6ef83c468086a…
level_5_M_Omega_normalised.npy	5	e40622b725554c0c…
level_5_slot_response.npy	5	460fd05bc5df96d1…
level_6_H_physical.npy	6	d19c373dc6a9a9fa…
level_6_M_Omega_normalised.npy	6	11d50fa74398afd6…

Frozen object	Level	SHA-256 prefix
level_6_slot_response.npy	6	8f21ce5601c2f1bd…
representation_ledger.json	—	70f76b954b379a0c…

Complete hashes are stored in `results/frozen_input_manifest.json`. All generated arrays, tables, figures, certificates and scripts are covered by `sha256_manifest.json`.

Appendix D — Reproducibility commands

```
python run_hcmr_mr1.py
python verify_hcmr_mr1.py
python build_hcmr_mr1_paper.py
```

Appendix E — Source ledger

[1] K. Taylor, *The VERSF Master Substrate Action and Constitutive-Descent Theorem* (MASD-1). [2] K. Taylor, *History-Metric Geometry, Branch and Clock Framework* (HMGBC-1), VERSF Standard Model Closure Series. [3] K. Taylor, *MASD–HMGBC Reduced Physical Evaluation Attempt* (MHPE-1). [4] K. Taylor, *Full-Carrier Finite-Regulator Hamiltonian and Primitive Terminal Instrument* (FCHI-1). [5] K. Taylor, *Representation-Resolved History Functional and Frozen Differentiation Test* (RRHF-1). [6] K. Taylor, *Primitive-Transfer Representation-Ledger Uniqueness Attempt* (PRLU-1). [7] K. Taylor, *The D36 Clock-Convention, Reproducibility and Manifest-Currency Theorem in VERSF* (D36-R1). [8] K. Taylor, *The K = 7 Closure-Born-TPB Renewal Construction in VERSF* (K7-CBR-1). [9] K. Taylor, *The Absolute-Scale, Action-Normalisation and Closure-Clock Conditional Theorem in VERSF* (ASAC-1). [10] K. Taylor, *The Renormalised Standard Model Parameter-Closure Theorem in VERSF* and the *Standard Model Derivation Master Ledger*. [11] *HCMR-MR1 calculation package*: frozen arrays, scripts, manifests and independent verification.