How to Read and Use This Data: A Simple Guide

Evan Wesley - Vivi The Physics Slayer!

This dataset presents a compact, integer-based encoding of fundamental physical constants—structured like a **"Periodic Table of Constants."** All values are derived from whole numbers and modular arithmetic, revealing hidden patterns and enabling exact reconstruction.

The Core Idea

Every physical constant is approximated by a large integer k (its "atomic number") scaled by a Circular Ball/Universal quantum unit U:

$$\text{Constant} \approx k \cdot U$$

where the Circular Ball/Universal unit is defined as:

$$U = \frac{1}{49 \cdot 50 \cdot 137^6}.$$

Most entries use depth $p = 6$, meaning the denominator includes 137^6. A few (e.g., the upper bound on $\bar{\theta}_{\text{QCD}}$) use higher depth and are noted accordingly.

This formulation allows physical constants to be represented exactly as integers, with extremely small relative errors (often below 10^{-15}).

The Two Tables

1. Master Table (`Output Data EZ Read.txt`)

This table lists the encoded constants:

Sector: Category of the constant (e.g., `CORE`, `CKM`, `HIGGS/YUKAWA`)

Symbol: Standard physics notation

Value: Experimental or best-fit numerical value

k **(Atomic Number)**: The integer that encodes the constant

Relative Error: Accuracy of the approximation $k \cdot U$ vs. the true value

Sector	Symbol	Value	k (Atomic Number)	Relative Error
CORE	α^{-1} (CODATA)	137.035999207	2219852703392369647	1.37×10^{-19}
CORE	$\alpha^{-1}(M_Z, \text{eff})$	127.955	2072749163039352758	1.21×10^{-19}
CORE	$\sin^2\theta_W(M_Z, \text{MS})$	0.23122	3745543835551242	5.31×10^{-17}
CORE	μ/e mass	206.768283	3349449302734039554	4.48×10^{-20}
CORE	τ/μ mass	16.816706	272414624567846991	6.88×10^{-19}
CORE	p/e mass	1836.15267343	29743924950681899968	8.95×10^{-21}
CORE	a_e (leptonic)	0.001159652181	18785261127619	8.68×10^{-15}
CORE	a_μ (exp)	0.0011659206	18886803546718	1.58×10^{-14}
CORE	$\Delta\alpha$ (models)	5.02501×10^{-7}	8140037726	5.17×10^{-11}
CORE	Δc (models)	6.8842637×10^{-5}	1115185168404	2.67×10^{-13}

Sector	**Symbol**	**Value**	k	**Relative Error**
MASS RATIOS	τ/e	3477.161425	56326704185983339375	8.63×10^{-21}
MASS RATIOS	μ/p	0.112609526	1824167102878840	1.08×10^{-16}
MASS RATIOS	τ/p	1.893721299	30676481863985203	1.33×10^{-17}
MASS RATIOS	e/p	5.446170×10^{-4}	8822277171392	1.05×10^{-14}
MASS RATIOS	e/μ	0.004836331	78343968325123	1.14×10^{-15}
MASS RATIOS	e/τ	2.875909×10^{-4}	4658698815637	9.29×10^{-14}
MASS RATIOS	p/μ	8.880243366	143851486887289672	1.17×10^{-18}
MASS RATIOS	p/τ	0.528060808	8554082285037847	2.80×10^{-19}
CKM	$\|V_{ud}\|$	0.97435	15783542237563154	5.23×10^{-18}
CKM	$\|V_{us}\|$	0.22501	3644947748626351	4.68×10^{-17}
CKM	$\|V_{ub}\|$	0.003732	60454846441818	5.47×10^{-15}
CKM	$\|V_{cd}\|$	0.22487	3642679881932392	7.78×10^{-17}
CKM	$\|V_{cs}\|$	0.97349	15769611056443121	1.56×10^{-17}
CKM	$\|V_{cb}\|$	0.04183	677606170059287	6.66×10^{-16}
CKM	$\|V_{td}\|$	0.00858	138987830244052	1.52×10^{-15}
CKM	$\|V_{ts}\|$	0.04111	665942855633213	2.64×10^{-16}
CKM	$\|V_{tb}\|$	0.999118	16184760253820109	7.35×10^{-19}
CKM	J_{CKM}	3.12×10^{-5}	505410291797	8.86×10^{-13}
CKM	λ	0.22501	3644947748626351	4.68×10^{-17}
CKM	A	0.826	13380413494357433	2.24×10^{-17}
CKM	$\bar{\rho}$	0.1591	2577268507206135	6.01×10^{-17}
CKM	$\bar{\eta}$	0.3523	5706924544869399	3.77×10^{-17}
PMNS	$\sin^2\theta_{12}$	0.307	4973107678895559	7.04×10^{-17}
PMNS	$\sin^2\theta_{23}$	0.545	8828481058625667	2.83×10^{-17}
PMNS	$\sin^2\theta_{13}$	0.0218	353139242345027	8.78×10^{-16}
PMNS	δ_{CP}/π	1.083	17543568782553390	8.55×10^{-18}
PMNS	r_ν	0.0294795	477540463964327	7.90×10^{-16}
EW/QCD	$\alpha_s(M_Z)$	0.1179	1909867737269663	1.60×10^{-16}
EW/QCD	$\sin^2\theta_W^{\mathrm{eff},\ell}$	0.23153	3750565540373579	8.97×10^{-17}
EW/QCD	$G_F M_Z^2$	0.09698647	1571088459200101	8.31×10^{-17}
EW/QCD	M_W/M_Z	0.88153	14279946619468412	1.14×10^{-17}
EW/QCD	ρ_{check}	1.011223783	16380862419430803	7.56×10^{-18}
EW/QCD	Γ_Z/M_Z	0.02736337	443260532193774	5.65×10^{-16}
EW/QCD	α_1 [GUT]	0.01694296	274459899034155	6.18×10^{-16}
EW/QCD	α_2	0.03380005	547528625152178	7.07×10^{-16}
EW/QCD	α_3	0.1179	1909867737269663	1.60×10^{-16}
EW/QCD	g_1 [GUT]	0.46142342	7474620115207141	4.35×10^{-17}
EW/QCD	g_2	0.65172383	10557305530735293	4.35×10^{-18}
EW/QCD	g_3	1.21719969	19717476044673042	1.39×10^{-17}
EW/QCD	$\bar{\theta}_{\mathrm{QCD}}$ (null)	0	0	(exact)
EW/QCD	$\bar{\theta}_{\mathrm{QCD}}$ (upper)	2.5×10^{-10} (p=10)	1426631354132577	(snap-down)
HIGGS/YUKAWA	M_H/M_Z	1.3735420	22250072802689228	7.55×10^{-18}
HIGGS/YUKAWA	λ (Higgs Quartic)	0.1293838	2095895082329058	1.76×10^{-16}
HIGGS/YUKAWA	m_e/M_Z	5.6038×10^{-6}	90776557602	4.64×10^{-12}
HIGGS/YUKAWA	m_μ/M_Z	0.0011587	18769712773164	5.14×10^{-15}
HIGGS/YUKAWA	m_τ/M_Z	0.0194858	315650813254981	2.96×10^{-16}
HIGGS/YUKAWA	y_e	2.0754×10^{-6}	33619154268	1.07×10^{-11}
HIGGS/YUKAWA	y_μ	4.2912×10^{-4}	6951374737775	1.73×10^{-14}
HIGGS/YUKAWA	y_τ	0.0072166	116901473972260	4.07×10^{-15}
HIGGS/YUKAWA	m_u/M_Z	2.4126×10^{-5}	390819642043	6.24×10^{-13}

Sector	Symbol	Value	k	Relative Error
HIGGS/YUKAWA	y_u	1.0626×10^{-5}	172126190091	1.42×10^{-12}
HIGGS/YUKAWA	m_d/M_Z	5.1542×10^{-5}	834932871638	1.92×10^{-13}
HIGGS/YUKAWA	y_d	2.2700×10^{-5}	367724133376	8.06×10^{-13}
HIGGS/YUKAWA	m_s/M_Z	0.0010528	17053948016432	2.71×10^{-14}
HIGGS/YUKAWA	y_s	0.0004637	7510961022142	3.92×10^{-15}
HIGGS/YUKAWA	m_c/M_Z	0.0139273	225609520634054	1.99×10^{-15}
HIGGS/YUKAWA	y_c	0.0061339	99363755188754	6.96×10^{-16}
HIGGS/YUKAWA	m_b/M_Z	0.0458396	742557319882163	6.24×10^{-16}
HIGGS/YUKAWA	y_b	0.0201888	327039761172434	6.04×10^{-16}
HIGGS/YUKAWA	m_t/M_Z	1.8945558	30690000617904919	1.21×10^{-17}
HIGGS/YUKAWA	y_t	0.8344071	13516600272763094	1.70×10^{-17}
HIGGS/YUKAWA	$m_{\nu 1}/M_Z$	1.0966×10^{-13}	625800593121	3.96×10^{-13}
HIGGS/YUKAWA	$m_{\nu 2}/M_Z$	1.4474×10^{-13}	825961959206	1.00×10^{-13}
HIGGS/YUKAWA	$m_{\nu 3}/M_Z$	5.6100×10^{-13}	3201384454595	3.29×10^{-14}
HIGGS/YUKAWA	$y_{\nu 1}$	4.8299×10^{-14}	275617344326	9.12×10^{-13}
HIGGS/YUKAWA	$y_{\nu 2}$	6.3747×10^{-14}	363773131910	4.16×10^{-14}
HIGGS/YUKAWA	$y_{\nu 3}$	2.4708×10^{-13}	1409965236917	1.72×10^{-13}

2. DNA Fingerprint Table (`Output Data (DNA) EZ Read.txt`)

This table provides the modular "fingerprint" of each k:

Residue (mod 23, 49, 50, 137): The tuple (k mod 23, k mod 49, k mod 50, k mod 137)

This 4-number signature acts as a unique identifier—useful for detecting algebraic relationships, symmetries, or families among constants

Sector	Symbol	Residue (mod 23, 49, 50, 137)
CORE	α^{-1} (CODATA)	(3, 42, 47, 5)
CORE	$\alpha^{-1}(M_Z, \text{eff})$	(0, 37, 8, 103)
CORE	$\sin^2\theta_W(M_Z, \text{MS})$	(18, 32, 42, 65)
CORE	μ/e mass	(15, 35, 4, 63)
CORE	τ/μ mass	(8, 34, 41, 92)
CORE	p/e mass	(21, 38, 18, 60)
CORE	a_e (leptonic)	(12, 42, 19, 25)
CORE	a_μ (exp)	(10, 9, 18, 7)
CORE	$\Delta\alpha$ (models)	(17, 44, 26, 105)
CORE	Δc (models)	(17, 41, 4, 79)
MASS RATIOS	τ/e	(10, 8, 25, 48)
MASS RATIOS	μ/p	(5, 41, 40, 43)
MASS RATIOS	τ/p	(21, 15, 3, 73)
MASS RATIOS	e/p	(9, 27, 42, 108)
MASS RATIOS	e/μ	(15, 4, 23, 8)
MASS RATIOS	e/τ	(0, 20, 37, 9)
MASS RATIOS	p/μ	(12, 22, 22, 57)
MASS RATIOS	p/τ	(1, 12, 47, 106)
CKM	$\lvert V_{ud}\rvert$	(21, 47, 4, 134)
CKM	$\lvert V_{us}\rvert$	(21, 27, 1, 61)
CKM	$\lvert V_{ub}\rvert$	(20, 31, 18, 18)
CKM	$\lvert V_{cd}\rvert$	(13, 14, 42, 95)
CKM	$\lvert V_{cs}\rvert$	(22, 38, 21, 11)

Sector	Symbol	Residue
CKM	$\|V_{cb}\|$	(15, 35, 37, 131)
CKM	$\|V_{td}\|$	(17, 13, 2, 82)
CKM	$\|V_{ts}\|$	(1, 39, 13, 111)
CKM	$\|V_{tb}\|$	(6, 7, 9, 119)
CKM	J_{CKM}	(21, 47, 47, 68)
CKM	λ	(21, 27, 1, 61)
CKM	A	(4, 34, 33, 123)
CKM	$\bar{\rho}$	(6, 29, 35, 43)
CKM	$\bar{\eta}$	(11, 26, 49, 95)
PMNS	$\sin^2\theta_{12}$	(2, 7, 9, 75)
PMNS	$\sin^2\theta_{23}$	(1, 12, 17, 34)
PMNS	$\sin^2\theta_{13}$	(16, 40, 27, 51)
PMNS	δ_{CP}/π	(22, 17, 40, 130)
PMNS	r_ν	(5, 1, 27, 118)
EW/QCD	$\alpha_s(M_Z)$	(15, 3, 13, 101)
EW/QCD	$\sin^2\theta_W^{\mathrm{eff},\ell}$	(7, 4, 29, 77)
EW/QCD	$G_F M_Z^2$	(6, 44, 1, 70)
EW/QCD	M_W/M_Z	(13, 29, 12, 9)
EW/QCD	ρ_{check}	(16, 14, 3, 9)
EW/QCD	Γ_Z/M_Z	(5, 1, 24, 114)
EW/QCD	α_1 [GUT]	(12, 23, 5, 83)
EW/QCD	α_2	(18, 12, 28, 18)
EW/QCD	α_3	(15, 3, 13, 101)
EW/QCD	g_1 [GUT]	(16, 29, 41, 101)
EW/QCD	g_2	(17, 8, 43, 61)
EW/QCD	g_3	(11, 41, 42, 58)
EW/QCD	$\bar{\theta}_{\mathrm{QCD}}$ (null)	(0, 0, 0, 0)
EW/QCD	$\bar{\theta}_{\mathrm{QCD}}$ (upper)	(6, 19, 27, 133)
HIGGS/YUKAWA	M_H/M_Z	(8, 7, 28, 42)
HIGGS/YUKAWA	λ (Higgs Quartic)	(15, 31, 8, 9)
HIGGS/YUKAWA	m_e/M_Z	(6, 10, 2, 32)
HIGGS/YUKAWA	m_μ/M_Z	(10, 31, 14, 113)
HIGGS/YUKAWA	m_τ/M_Z	(11, 15, 31, 122)
HIGGS/YUKAWA	y_e	(11, 7, 18, 86)
HIGGS/YUKAWA	y_μ	(2, 41, 25, 82)
HIGGS/YUKAWA	y_τ	(14, 40, 10, 62)
HIGGS/YUKAWA	m_u/M_Z	(16, 5, 43, 14)
HIGGS/YUKAWA	y_u	(6, 30, 41, 15)
HIGGS/YUKAWA	m_d/M_Z	(15, 47, 38, 124)
HIGGS/YUKAWA	y_d	(22, 26, 26, 119)
HIGGS/YUKAWA	m_s/M_Z	(10, 19, 32, 98)
HIGGS/YUKAWA	y_s	(19, 11, 42, 46)
HIGGS/YUKAWA	m_c/M_Z	(22, 11, 4, 52)
HIGGS/YUKAWA	y_c	(6, 0, 4, 61)
HIGGS/YUKAWA	m_b/M_Z	(20, 16, 13, 74)
HIGGS/YUKAWA	y_b	(9, 37, 34, 86)
HIGGS/YUKAWA	m_t/M_Z	(18, 18, 19, 119)
HIGGS/YUKAWA	y_t	(4, 24, 44, 86)
HIGGS/YUKAWA	$m_{\nu 1}/M_Z$	(1, 46, 21, 4)
HIGGS/YUKAWA	$m_{\nu 2}/M_Z$	(16, 20, 6, 36)
HIGGS/YUKAWA	$m_{\nu 3}/M_Z$	(15, 19, 45, 78)

Sector	Symbol	Residue
HIGGS/YUKAWA	$y_{\nu 1}$	(18, 37, 26, 5)
HIGGS/YUKAWA	$y_{\nu 2}$	(12, 27, 10, 15)
HIGGS/YUKAWA	$y_{\nu 3}$	(16, 20, 17, 108)

Why This Format Is Useful

Enables **exact arithmetic** with physical constants using only integers

Reveals **number-theoretic structure** in the Standard Model parameters

Simplifies **reproduction, validation, and extension** of the dataset in code

Facilitates pattern searches via **modular residue comparisons**
To reconstruct any constant: multiply its k by U.
To explore relationships: compare residue tuples across sectors.