# How to Read and Use This Data: A Simple Guide

Evan Wesley - Vivi The Physics Slayer!

October 1, 2025

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

# Appendix: Full Tables

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

**Columns:** Sector | Symbol | Value | k (Atomic Number) | Relative Error

| Sector | Symbol | Value | k (Atomic Number) | Relative Error |
|---|---|---|---|---|
| CORE | $^{1}$ (CODATA) | 137.035999207 | 2219852703392369647 | 1.37e-19 |
| CORE | $^{1}$(MZ,eff) | 127.955 | 2072749163039352758 | 1.21e-19 |
| CORE | sin$^{2}$_W(MZ,MS) | 0.23122 | 3745543835551242 | 5.31e-17 |
| CORE | /e mass | 206.768283 | 3349449302734039554 | 4.48e-20 |
| CORE | / mass | 16.816706 | 272414624567846991 | 6.88e-19 |
| CORE | p/e mass | 1836.15267343 | 29743924950681899968 | 8.95e-21 |
| CORE | a_e (leptonic) | 0.001159652181 | 18785261127619 | 8.68e-15 |
| CORE | a_ (exp) | 0.0011659206 | 18886803546718 | 1.58e-14 |
| CORE | (models) | 5.02501e-7 | 8140037726 | 5.17e-11 |
| CORE | c (models) | 6.8842637e-5 | 1115185168404 | 2.67e-13 |
| MASS RATIOS | /e | 3477.161425 | 56326704185983339375 | 8.63e-21 |
| MASS RATIOS | /p | 0.112609526 | 1824167102878840 | 1.08e-16 |
| MASS RATIOS | /p | 1.893721299 | 30676481863985203 | 1.33e-17 |
| MASS RATIOS | e/p | 5.446170e-4 | 8822277171392 | 1.05e-14 |
| MASS RATIOS | e/ | 0.004836331 | 78343968325123 | 1.14e-15 |
| MASS RATIOS | e/ | 2.875909e-4 | 4658698815637 | 9.29e-14 |
| MASS RATIOS | p/ | 8.880243366 | 143851486887289672 | 1.17e-18 |
| MASS RATIOS | p/ | 0.528060808 | 8554082285037847 | 2.80e-19 |
| CKM | \|V_ud\| | 0.97435 | 15783542237563154 | 5.23e-18 |
| CKM | \|V_us\| | 0.22501 | 3644947748626351 | 4.68e-17 |
| CKM | \|V_ub\| | 0.003732 | 60454846441818 | 5.47e-15 |
| CKM | \|V_cd\| | 0.22487 | 3642679881932392 | 7.78e-17 |
| CKM | \|V_cs\| | 0.97349 | 15769611056443121 | 1.56e-17 |
| CKM | \|V_cb\| | 0.04183 | 677606170059287 | 6.66e-16 |
| CKM | \|V_td\| | 0.00858 | 138987830244052 | 1.52e-15 |
| CKM | \|V_ts\| | 0.04111 | 665942855633213 | 2.64e-16 |
| CKM | \|V_tb\| | 0.999118 | 16184760253820109 | 7.35e-19 |
| CKM | J_CKM | 3.12e-5 | 505410291797 | 8.86e-13 |
| CKM | | 0.22501 | 3644947748626351 | 4.68e-17 |
| CKM | A | 0.826 | 13380413494357433 | 2.24e-17 |
| CKM | | 0.1591 | 2577268507206135 | 6.01e-17 |
| CKM | | 0.3523 | 5706924544869399 | 3.77e-17 |
| PMNS | sin$^{2}$ | 0.307 | 4973107678895559 | 7.04e-17 |
| PMNS | sin$^{2}$ | 0.545 | 8828481058625667 | 2.83e-17 |
| PMNS | sin$^{2}$ | 0.0218 | 353139242345027 | 8.78e-16 |
| PMNS | _CP/ | 1.083 | 17543568782553390 | 8.55e-18 |
| PMNS | r_ | 0.0294795 | 477540463964327 | 7.90e-16 |
| EW/QCD | _s(M_Z) | 0.1179 | 1909867737269663 | 1.60e-16 |
| EW/QCD | sin$^{2}$_W^eff, | 0.23153 | 3750565540373579 | 8.97e-17 |
| EW/QCD | G_F·M_Z$^{2}$ | 0.09698647 | 1571088459200101 | 8.31e-17 |
| EW/QCD | M_W/M_Z | 0.88153 | 14279946619468412 | 1.14e-17 |
| EW/QCD | _check | 1.011223783 | 16380862419430803 | 7.56e-18 |
| EW/QCD | _Z/M_Z | 0.02736337 | 443260532193774 | 5.65e-16 |
| EW/QCD | [GUT] | 0.01694296 | 274459899034155 | 6.18e-16 |
| EW/QCD | | 0.03380005 | 547528625152178 | 7.07e-16 |
| EW/QCD | | 0.1179 | 1909867737269663 | 1.60e-16 |
| EW/QCD | g [GUT] | 0.46142342 | 7474620115207141 | 4.35e-17 |
| EW/QCD | g | 0.65172383 | 10557305530735293 | 4.35e-18 |
| EW/QCD | g | 1.21719969 | 19717476044673042 | 1.39e-17 |
| EW/QCD | _QCD (null) | 0 | 0 | (exact) |
| EW/QCD | _QCD (upper) | 2.5e-10 (p=10) | 1426631354132577 | (snap-down) |
| HIGGS/YUKAWA | M_H/M_Z | 1.3735420 | 22250072802689228 | 7.55e-18 |
| HIGGS/YUKAWA | (Higgs Quartic) | 0.1293838 | 2095895082329058 | 1.76e-16 |
| HIGGS/YUKAWA | m_e/M_Z | 5.6038e-6 | 90776557602 | 4.64e-12 |

| | | | | | |
|---|---|---|---|---|---|
| HIGGS/YUKAWA | m_/M_Z | 0.0011587 | 18769712773164 | 5.14e-15 | |
| HIGGS/YUKAWA | m_/M_Z | 0.0194858 | 315650813254981 | 2.96e-16 | |
| HIGGS/YUKAWA | y_e | 2.0754e-6 | 33619154268 | 1.07e-11 | |
| HIGGS/YUKAWA | y_ | 4.2912e-4 | 6951374737775 | 1.73e-14 | |
| HIGGS/YUKAWA | y_ | 0.0072166 | 116901473972260 | 4.07e-15 | |
| HIGGS/YUKAWA | m_u/M_Z | 2.4126e-5 | 390819642043 | 6.24e-13 | |
| HIGGS/YUKAWA | y_u | 1.0626e-5 | 172126190091 | 1.42e-12 | |
| HIGGS/YUKAWA | m_d/M_Z | 5.1542e-5 | 834932871638 | 1.92e-13 | |
| HIGGS/YUKAWA | y_d | 2.2700e-5 | 367724133376 | 8.06e-13 | |
| HIGGS/YUKAWA | m_s/M_Z | 0.0010528 | 17053948016432 | 2.71e-14 | |
| HIGGS/YUKAWA | y_s | 0.0004637 | 7510961022142 | 3.92e-15 | |
| HIGGS/YUKAWA | m_c/M_Z | 0.0139273 | 225609520634054 | 1.99e-15 | |
| HIGGS/YUKAWA | y_c | 0.0061339 | 99363755188754 | 6.96e-16 | |
| HIGGS/YUKAWA | m_b/M_Z | 0.0458396 | 742557319882163 | 6.24e-16 | |
| HIGGS/YUKAWA | y_b | 0.0201888 | 327039761172434 | 6.04e-16 | |
| HIGGS/YUKAWA | m_t/M_Z | 1.8945558 | 30690000617904919 | 1.21e-17 | |
| HIGGS/YUKAWA | y_t | 0.8344071 | 13516600272763094 | 1.70e-17 | |
| HIGGS/YUKAWA | m_1/M_Z (p=10) | 1.0966e-13 | 625800593121 | 3.96e-13 | |
| HIGGS/YUKAWA | m_2/M_Z (p=10) | 1.4474e-13 | 825961959206 | 1.00e-13 | |
| HIGGS/YUKAWA | m_3/M_Z (p=10) | 5.6100e-13 | 3201384454595 | 3.29e-14 | |
| HIGGS/YUKAWA | y_1 (p=10) | 4.8299e-14 | 275617344326 | 9.12e-13 | |
| HIGGS/YUKAWA | y_2 (p=10) | 6.3747e-14 | 363773131910 | 4.16e-14 | |
| HIGGS/YUKAWA | y_3 (p=10) | 2.4708e-13 | 1409965236917 | 1.72e-13 | |

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

**Columns:** Sector | Symbol | Residue (mod 23, 49, 50, 137)

| Sector | Symbol | Residue (mod 23, 49, 50, 137) |
|---|---|---|
| CORE | ¹ (CODATA) | (3, 42, 47, 5) |
| CORE | ¹(MZ,eff) | (0, 37, 8, 103) |
| CORE | sin²_W(MZ,MS) | (18, 32, 42, 65) |
| CORE | /e mass | (15, 35, 4, 63) |
| CORE | / mass | (8, 34, 41, 92) |
| CORE | p/e mass | (21, 38, 18, 60) |
| CORE | a_e (leptonic) | (12, 42, 19, 25) |
| CORE | a_ (exp) | (10, 9, 18, 7) |
| CORE | (models) | (17, 44, 26, 105) |
| CORE | c (models) | (17, 41, 4, 79) |
| MASS RATIOS | /e | (10, 8, 25, 48) |
| MASS RATIOS | /p | (5, 41, 40, 43) |
| MASS RATIOS | /p | (21, 15, 3, 73) |
| MASS RATIOS | e/p | (9, 27, 42, 108) |
| MASS RATIOS | e/ | (15, 4, 23, 8) |
| MASS RATIOS | e/ | (0, 20, 37, 9) |
| MASS RATIOS | p/ | (12, 22, 22, 57) |
| MASS RATIOS | p/ | (1, 12, 47, 106) |
| CKM | \|V_ud\| | (21, 47, 4, 134) |
| CKM | \|V_us\| | (21, 27, 1, 61) |
| CKM | \|V_ub\| | (20, 31, 18, 18) |
| CKM | \|V_cd\| | (13, 14, 42, 95) |
| CKM | \|V_cs\| | (22, 38, 21, 11) |
| 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 | | (21, 27, 1, 61) |
| CKM | A | (4, 34, 33, 123) |
| CKM | | (6, 29, 35, 43) |
| CKM | | (11, 26, 49, 95) |

| | | |
|---|---|---|
| PMNS | sin$^2$ | (2, 7, 9, 75) |
| PMNS | sin$^2$ | (1, 12, 17, 34) |
| PMNS | sin$^2$ | (16, 40, 27, 51) |
| PMNS | _CP/ | (22, 17, 40, 130) |
| PMNS | r_ | (5, 1, 27, 118) |
| EW/QCD | _s(M_Z) | (15, 3, 13, 101) |
| EW/QCD | sin$^2$_W^eff, | (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 | _check | (16, 14, 3, 9) |
| EW/QCD | _Z/M_Z | (5, 1, 24, 114) |
| EW/QCD | [GUT] | (12, 23, 5, 83) |
| EW/QCD | | (18, 12, 28, 18) |
| EW/QCD | | (15, 3, 13, 101) |
| EW/QCD | g [GUT] | (16, 29, 41, 101) |
| EW/QCD | g | (17, 8, 43, 61) |
| EW/QCD | g | (11, 41, 42, 58) |
| EW/QCD | _QCD (null) | (0, 0, 0, 0) |
| EW/QCD | _QCD (upper) (p=10) | (6, 19, 27, 133) |
| HIGGS/YUKAWA | M_H/M_Z | (8, 7, 28, 42) |
| HIGGS/YUKAWA | (Higgs Quartic) | (15, 31, 8, 9) |
| HIGGS/YUKAWA | m_e/M_Z | (6, 10, 2, 32) |
| HIGGS/YUKAWA | m_/M_Z | (10, 31, 14, 113) |
| HIGGS/YUKAWA | m_/M_Z | (11, 15, 31, 122) |
| HIGGS/YUKAWA | y_e | (11, 7, 18, 86) |
| HIGGS/YUKAWA | y_ | (2, 41, 25, 82) |
| HIGGS/YUKAWA | y_ | (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_1/M_Z (p=10) | (1, 46, 21, 4) |
| HIGGS/YUKAWA | m_2/M_Z (p=10) | (16, 20, 6, 36) |
| HIGGS/YUKAWA | m_3/M_Z (p=10) | (15, 19, 45, 78) |
| HIGGS/YUKAWA | y_1 (p=10) | (18, 37, 26, 5) |
| HIGGS/YUKAWA | y_2 (p=10) | (12, 27, 10, 15) |
| HIGGS/YUKAWA | y_3 (p=10) | (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.