

Technical companion: the common chronological construction

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1. Row changes and ordered measurement

For ordinary compatible rows, $R_d(b, r, L) = (b + d, r - d, L)$ and $A_e(b, r, L) = (b, r + e, L + e)$. Any compatible row difference has the unique parameters $d = \Delta b, e = \Delta L$. These algebraic operations commute on unrestricted triples. When nonnegative ages or source-selected states are required, each intermediate row must also be admissible.

The nineteen matched MT/LXX rows have the following nonzero supports:

Source change	Rows	Amplitude
Begetting change	Adam, Seth, Enosh, Kenan, Mahalalel, Enoch; Arphaxad, Shelah, Eber, Peleg, Reu, Serug	$u = 100$
Begetting change	Nahor	$u/2 = 50$
Lifespan change	Lamech	$\lambda = -24$
Lifespan change	Arphaxad, Shelah	$a = 27$
Lifespan change	Eber	$e = 40$
Lifespan change	Peleg, Reu, Serug	$u = 100$
Lifespan change	Nahor	$n = 60$

The 38-output change matrix has rank five. Imposing the fitted relation $e + n = u$ reduces the parameter count to four; neither description claims to generate the baseline source rows. The matched head measurements are

$$\Delta_{\text{Reg}} = 12.5u, \quad \Delta_{\text{Cum}} = 3u + \lambda + 2a + e + n.$$

At the source values these are 1250 and 430. Native Cainan contributes a labelled insertion with measures 130 and 460.

Let U be the suffix-sum matrix for a fixed ordered path. With common terminal, $X' - X = U(w' - w)$; with changed terminal, add its difference to each boundary. Adjacent differences recover the weights. Thus the complete field retains location, while its head alone cannot recover the distribution.

Source/proof route: complete source-row packet; whole-genealogy five-amplitude matrix; C1162-C1189; Regular staircase C1253-C1264.

2. Rounded rows, residuals and recovery

For signed integer arguments use $Q_{\mathbb{Z}}(x) = 5\lfloor(x + 2)/5\rfloor$. On source ages this is nearest-five rounding with residual $\rho = x - Q(x) \in \{-2, -1, 0, 1, 2\}$.

Retaining $y = Q(x)$ and ρ allows an exact source change d :

$$T_d(y, \rho) = (y + Q_{\mathbb{Z}}(\rho + d), \rho + d - Q_{\mathbb{Z}}(\rho + d)).$$

Since y is a multiple of five, this equals the encoding of $x + d$. Consequently $T_e T_d = T_{d+e}$, whenever the declared source domains allow the intermediate changes. A universal translation action on rounded values alone exists for integer changes precisely when $5 \mid d$; other changes need the residual.

For an ordinary row retain rounded begetting and remainder values B, R , together with exact lifespan L . Put $z = L - B - R$. The possible residual pairs satisfy

$$u + v = z, \quad -2 \leq u, v \leq 2.$$

In the interior nonnegative domain their number is $5 - |z|$, for $|z| \leq 4$. Boundary restrictions can reduce this count. The selected 55 ordinary source rows contain five uniquely determined pairs

and fifty ambiguous pairs under these retained observations. For LXX Lamech, $L = 753$, $B = 180$, $R = 570$ still permits 181/572 or 182/571; the selected source pair is needed.

If only the three rounded measures are retained, the carry $Q(L) - B - R$ is -5 , 0 or $+5$, with 3, 19 or 3 residual pairs respectively in the unrestricted interior cell. This is a different information question from retaining exact L .

Accumulation acts before any optional re-rounding: $Uw = UQ(w) + U\rho$. A block residual is a sum of row residuals and need not lie in one cell. The Moses blocks retain residuals 0, 2, 4, -1 , 1. Their six-year total recovers the strict Actual head. The located downstream sums of individual row residuals recover every interior coordinate without altering the Rounded field.

Source/proof route: C1190-C1202, C1212-C1222, C1277-C1279; joint-row and residual-lift models.

3. Capacity, clipping and rounding

Write baseline slack as $s_i = c_i^{MT} - L_i$, and capacity loss as $d_i = c_i^{MT} - c_i^{SP}$. Then the clipped life reduction is

$$L_i - \min(L_i, c_i^{SP}) = \max(0, d_i - s_i).$$

The SP capacity losses are 350 for the first six ancestors, 250 for Enoch and Methuselah, and 130 for Lamech. Baseline slack prevents six of these losses from clipping a life; the remaining reductions are 115, 249 and 124.

Because Q is monotone,

$$Q(\min(L, c)) = \min(Q(L), Q(c)).$$

This identity requires the same resolved count convention on both inputs. It does not identify raw nominal SP age labels with completed durations.

For nonnegative integers L, c , with capacity c fixed, observing $q = Q(\min(L, c))$ gives three cases:

Observed q	Possible baseline lives
$q < Q(c)$	The ordinary rounding cell $Q(L) = q$, intersected with nonnegative integers
$q = Q(c)$	Every $L \geq \max(0, Q(c) - 2)$
$q > Q(c)$	None

If the clipping branch is known, its residual is fixed by $c - Q(c)$, and the missing information is the discarded excess. In the unclipped branch the excess is zero and the missing information is the within-cell residual. Forgetting which branch occurred combines those possibilities.

For Jared, Methuselah and Lamech, observing only the capped rounded values admits baseline thresholds 843, 718 and 653. A reduction is visibly strict after rounding only at baseline thresholds 848, 723 and 658. The actual baselines exceed them. The exact total reduction 488 becomes 485 in the rounded display: 115+250+120.

These results explain what a complete reconstruction must retain. They do not reconstruct an arbitrarily long clipped life from its cap.

Source/proof route: C1139-C1151, C1203-C1211; cap/round fibre, branch and strict-visibility models.

4. Original-span register theorem

For the two-component Creation inverse paths, an exact register argument explains their outer-span agreement. Consider two original spans, each equal to ten times a three-digit core ending in

a nonzero digit. Each span therefore has exactly one trailing zero. Let H, T, U be the sums of the cores' hundreds, tens and units columns. The original and transformed totals are

$$10(100H + 10T + U), \quad 10(H + 10T + 100U),$$

with $2 \leq H, U \leq 18$ and $0 \leq T \leq 18$. A total 2700 forces $U=10$ and $10H+T=26$, hence uniquely $(H, T, U)=(2, 6, 10)$ and transformed total 10620. A total 12600 instead permits $(12, 5, 10)$ or $(11, 15, 10)$, giving 10620 or 11610. The literal cumulative cores 917 and 343 select the first: their units carry into the tens, but their tens produce no further carry. Regular convergence follows from total and register; cumulative convergence additionally uses the source-selected carry branch. The theorem recovers aggregate measurements, while the source supplies the actual split. Its register restriction applies to these two-component calculations. [C938-C947]

The operation is applied only to original source durations in this account. A digit reversal is distinct from a coordinate reflection or formal Mirror. The named partition is retained; no second reversal is introduced.

5. Keys, anchors and integer stages

An anchored Key acts as $D_{k,a}(x) = a + k(x - a)$. In a common linear coordinate chart, $D_k T_t = T_{kt} D_k$; anchor offsets must be carried when pivots differ. Rational spans compose under the exact factors. Requiring integer intermediate coordinates is an additional condition.

For a reduced factor p/q and integer pivot a , an integer input x gives an integer output precisely when $q \mid (x - a)$. This yields the Priestly modulus 23 and the two-stage duration ladder $529k \rightarrow 575k \rightarrow 625k$.

A fixed-pivot example shows why rational composition alone is insufficient. Apply $J = 300/299$ about 14006, then $P = 70/69$ about 4836. The first integer stage requires $x = 14006 + 299t$ and yields $y = 14006 + 300t$. Its distance from the second pivot is $9170 + 300t$, always 2 modulo 3. It is therefore never divisible by 69. This emptiness belongs to those pivots and integer-stage requirements, not to all J/P applications.

Uniform conversion commutes with addition. A block grouping B commutes with a diagonal selection of factors K , in the sense $BK = \bar{K}B$ for every input, precisely when each grouped block uses one common factor. Different partial-conversion routes can have equal totals while retaining different interior positions.

For crossing the civil BC/AD epoch, elapsed years use $BC + AD - 1$. The source's Rounded endpoint-width convention $BC + AD - 2$ is a separately declared measurement. A formula valid in one convention is not silently transported to the other.

The original Keys satisfy $336E = 360P = 364J = 8400/23$. The Sothic companion $H = 2923/2921$ does not satisfy $365H = 8400/23$; the exact-K extension is $G = 1680/1679$. Sharing an operation family is broader than sharing exact calibration.

Source/proof route: inherited Key and fixed-pivot models; C1299, C1307-C1308; Strategy §§3.3-3.4.

6. Covenant paths, joins and exact phases

This section supplies the algebra behind the reader draft's source-to-path explanation. Regular coordinates follow supplied ages and household intervals; cumulative coordinates follow complete lifespans. Their common ordered-path form allows shared source values to force some joins, while other joins require additional source relations. All calculations below are inherited results.

For the seven cumulative boundaries in Abraham-to-Moses order, let

$$\ell = (175, 180, 147, 137, 133, 137), \quad b_i = M + \sum_{r=i}^6 \ell_r, \quad i = 1, \dots, 7,$$

with empty sum zero and fixed Moses anchor $M = 1526$. This is the suffix-sum path construction $b = M\mathbf{1} + U\ell$. Here U is the 7×6 matrix with $U_{ir} = 1$ when $r \geq i$, otherwise zero; its final row is zero. Adjacent differences recover the six ordered lifespan inputs. It generates $b = (2435, 2260, 2080, 1933, 1796, 1663, 1526)$. The regular path uses its own edge roles, so shared path form does not identify regular births with cumulative boundaries. Sources: File 62 §2.1; File 61 §7.3A; C1051; inherited technical companion §1.

In the full regular comparison, put Levi birth $B = 1919$, Levi death $D = 1782$, Exodus $e = 1446$, and lifespans $L = 137, K = 133, A = 137$ for Levi, Kohath and Amram. The source's maximum envelope assumes successive lives occupy consecutive blocks. Subtracting regular elapsed chronology gives

$$d = [L + K + A + (M - e)] - (B - e) = M + K + A - D = 487 - 473 = 14.$$

Write cumulative Kohath $C_K = M + K + A$, cumulative Levi $C_L = C_K + L$, and cumulative Jacob $C_J = C_L + 147$. Then

$$C_K - d = D, \quad C_L - d = B.$$

The first join follows from the definition of d ; the second follows from the shared Levi lifespan and $B - D = L$. The third join, $C_J - d = R_I$, requires regular Isaac birth R_I to satisfy $R_I - B = 147$. Its source relation is $60 + 77 + 10 = 147$. Thus the third join reuses the Covenant family's intergenerational condition. It is not forced by the clutch alone. Sources: File 61 §§6.3,8.1-8.3; C1035,C1052-C1054.

Set $h = d/2 = 7$. The complete Nisan field is:

Cumulative boundary	Original	Half-clutch	Full clutch
Abraham	2435	2428	2421
Isaac	2260	2253	2246
Jacob	2080	2073	2066
Levi	1933	1926	1919
Kohath	1796	1789	1782
Amram	1663	1656	1649
Moses-side interface	1526	1519	1512

The exact Aaron/Tishri field retains the same h and adds $p = 3.5$:

Cumulative boundary	Original exact phase	Half-clutch	Full clutch
Abraham	2438.5	2431.5	2424.5
Isaac	2263.5	2256.5	2249.5
Jacob	2083.5	2076.5	2069.5
Levi	1936.5	1929.5	1922.5
Kohath	1799.5	1792.5	1785.5
Amram	1666.5	1659.5	1652.5
Aaron-side interface	1529.5	1522.5	1515.5

These are File 62 §§1.2-1.4's complete tables. Final-row translations are interfaces, not relocated historical births. The separate whole-year Levi display is 1936; it must not replace exact 1936.5 in phase equations.

The forty-two entries satisfy

$$X_{ijk} = b_i + jp - kh, \quad j \in \{0, 1\}, \quad k \in \{0, 1, 2\}.$$

Each horizontal row has equal seven-year steps; every vertical column preserves ℓ . In the unrestricted array model, now allowing all seven b_i , p and h to vary, the map has rank nine and thirty-three linear output dependencies. The relations $h = 2p$ and $\ell_4 = \ell_6$ each remove one freedom. Separately fixing $p = 3.5$ and $h = 7$ would impose two fixed-value conditions, a different specification. One Nisan-derived clutch preserves phase throughout; recalculating a full clutch to the same regular landing would cancel phase. Sources: C1048-C1050,C1056.

The Covenant Key agreement illustrates the same distinction between definition and constraint. Let $Q = 1866$, $u = Q - D_{\text{Levi}} = 299$, $w = Q - D_{\text{Joseph}} = 276$, $J = 300/299$, and $E = 25/23$, using minimum-state deaths here. Defining $Y = Q - Ju$ supplies a generated point. Requiring $Y = Q - Ew$ adds the single condition $13w = 12u$, giving $Y = 1566$. Sources: File 60 §§6.1-6.2; C1040-C1041,C1047. The full Covenant 2081 remains author-designated; offering 2051/Isaac age fifteen remains proposed. Neither supplies an additional textual date.

The coupled model's nineteen local inputs generate fifty-five outputs, including the clutch; its rank nineteen describes this declared parameterization, not historical independence or a globally minimal explanation. C1057 and C1290 retain that scope.

Exact source hashes, excerpts and proof-record bindings are already frozen in `final_Covenant_claim_index.js` especially COV-10-COV-23. This supplement retains the inherited numerical family and its source operations.

7. Counts, grouping and symmetry

The proved complete Esau prefix bases are invertible integer encodings of its source counts. For Esau, the six clean prefixes, third and fifth female prefixes, and grand total recover all nine counts by addition and subtraction. This is a complete alternative description of nine numerical inputs, not their derivation from fewer independent values.

A grouping g carries an operation r to the grouped object precisely when

$$g(i) = g(j) \implies g(r(i)) = g(r(j)).$$

The condition says that one group cannot acquire two different images. For Toledot, occurrences 9 and 10 share Esau's section. Reflection $r(i) = 12 - i$ sends them to 3 and 2, distinct sections. Reflection therefore does not descend to the ten-section grouping. Giving Esau multiplicity two still preserves the eleven-occurrence measure.

The NT primary path has 77 edges of seventy years. Grouping them into eleven complete seven-edge blocks preserves duration and reverses block order under reflection, retaining twelve block boundaries. The separately displayed AD 65-135 extension is outside that primary object.

For the NT Key knot, if u is slot width and w the selected radius, the two comparison equations reduce to the same relation $w = 69u$. The separate metric relation $35u = 2450$ fixes $u = 70$, then $w = 4830$. Thus two displayed Key landings do not provide two independent scale conditions.

On the shared-name birth comparison, define $D_i = NT_i - S_i$. With coordinates decreasing toward later births,

$$D_{i+1} - D_i = (S_i - S_{i+1}) - (NT_i - NT_{i+1}).$$

All twenty-one edges follow this recurrence. Omitting Cainan from the shared-name display leaves an NT gap of 140 between Arphaxad and Shelah. Native LXX retains intervals 135 and 130 and changes the successive comparison values by 65 and 60.

Source/proof route: inherited structural-count and NT-knot models; C1266-C1272; grouping relation C1309.

8. Source-state reference

Choice	State used here	Consequence
Latest Rounded source	File52c	Controls the admitted original words and inverse comparisons
LXX Lamech	Selected 182/753, calculated remainder 571	Current joint working row; joint manuscript attestation is not established here
Older LXX 777	Appendix comparison	Does not replace the current main row
Lamech 188	Corruption audit only	No active chronology branch
Moses MT base	Terah 70, Cainan OFF, Shem +2 excluded	Strict Actual 4112, Rounded 4106
Standard Actual MT	Separate Shem +2 convention	Regular Creation 4114
Cumulative endpoint pair	Actual 14004; Rounded 14006	Retained selected completion endpoints
Native LXX Cainan	Included as a named 130/330/460 row	Regular insertion 130, lifespan insertion 460
SP Flood capacity	Noah 600 plus inclusive one	Resolved capacity, not ordinary biography remainder
SP Lamech begetting	Nominal 53rd year; completed 52 primary	Resolve counting before arithmetic
SP Terah	Official 145; Ideal 205 separately	Post-Flood Cumulative loss depends on the state
Covenant	Minimum 1866; full 2081 author-designated	The 460 span belongs to the minimum state
Offering comparison	2051 and Isaac fifteen proposed	Not a textual date/age supplied by Genesis 22
Covenant phase	Exact 3.5; whole-year display separate	Preserve 1936.5 in exact phase equations
NT	Named seventy-year slots and 6 BC hinge	Does not import the Covenant clutch or Moses field
Tishri ledger	Numbers-only days 1-22, Enochian fixed week, three Sabbaths	State behind the 280 total
Civil elapsed count	BC+AD-1	Distinct from Rounded endpoint width BC+AD-2
Gear actions	Declared Noah/Shem/Flood supports	No automatic upstream genealogy transport

Equal coordinates retain their source roles. Arphaxad birth and Flood at 2456 are distinct; the generated inverse Conquest-leg endpoint at 4106 is distinct from original Rounded Creation. The 4836 Flood companion in the 9890 comparison is Conquest-held. Native insertions are finite source choices, not licenses for unlimited repeated additions.

No canonical source is amended by this continuation. Files 16/55 and the 1486 bridge remain outside the active construction. A second decimal reversal is deferred. BJ and Sothic results keep their inherited source derivation, calibration and finite-domain qualifications.

Source/proof route: frozen source manifest, primitive-data register, C1330 clarifications and chapter claim indexes.

The companion accompanies the connected explanation at C1431. Exact source identities and literal claim locators are in the claim/source index; all formulas retain their completed source/proof routes.