THE QUANTITATIVE STEP

Sparse Segre–Yagzhev lift

Normalize the 11-variable degree-three map as

$$\Phi' = X + Q + C$$

Only seven components of the cubic part C are nonzero.

$$\widehat{\Psi}(X, Y, t) = \big(X + tQ(X) - t^2\iota(Y),\ Y + C_S(X),\ t\big)$$

$$\mathbf{11 + 7 + 1 = 19}$$

input + support auxiliaries + Segre variable

EXACT CLAIM

An explicit Yagzhev-form map in dimension 19

$$\widehat{G} = X + H : \mathbb{C}^{19} \longrightarrow \mathbb{C}^{19}$$

- Every nonzero component of H is cubic homogeneous.
- $(JH)^{18} = 0$, but $(JH)^{17} \neq 0$.
- Three distinct rational points have the same image.

$\det J\widehat{G} \equiv 1$, **while** $\widehat{G}$ **is not injective.**

EXACT CERTIFICATE

Nilpotency and collision

- $(JH)^{18} = 0$
- $(JH)^{17} \neq 0$
- Three pairwise-distinct rational points collide.

ONE EXPLICIT NONZERO ENTRY

$$\left((JH)^{17}\right)_{4,19} = -18t^{16}x^{10}y^{6}z^{2}$$

$\det J\widehat{G} \equiv 1$**, while** $\widehat{G}$ **is not injective.**

REPRODUCIBILITY

Two complementary exact verifiers

1 SymPy derivation

Reconstructs the 19-variable map from the posted 11-variable input and checks the identities symbolically.

2 Pure Python check

Checks the canonical JSON using only the standard library and exact rational dictionary polynomials.

No floating-point arithmetic nor numerical sampling.

PUBLIC CONSTRUCTIONS LOCATED BY 21 JULY 2026

Dimension comparison

Construction	Object	Dimension
Demirci	Explicit Yagzhev realization	79
u/Distinct-Soft-3991	Intermediate degree-three Keller map	17
Atkins-Turkish	Intermediate factor-aware degree-three map	11
Present note	**Explicit sparse Yagzhev lift**	**19**

The final Yagzhev-form comparison is 79 versus 19. The 11- and 17-variable objects are intermediate degree-three maps.