

Kategoriale Reduktion und Iteration

1. Zu den auffälligen Erscheinungen (vgl. zuletzt Toth 2026a) bei den Abbildungen 3-stelliger auf 4-stellige trajektische Relationen (vgl. Toth 2026b) gehören auch kategoriale Reduktion und Iteration, die im folgenden innerhalb des Systems der Selbstbezeichnung des Zeichens (vgl. Toth 2026c) dargestellt werden. (Reduktion wird rot, Iteration blau markiert.)

2. Kategoriale Reduktion und Iteration

M-them. M + ER

3.2	1.1	2.1	1.1	×	<u>1.1</u>	<u>1.2</u>	<u>1.1</u>	2.3	(M, M, M) → 0
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	1.2	2.1	2.3	×	3.2	1.2	<u>2.1</u>	<u>2.3</u>	(I, M) ← (0, 0)
3.2	1.1	2.1	1.1	×	<u>1.1</u>	<u>1.2</u>	<u>1.1</u>	2.3	(M, M, M) → 0
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	1.3	2.1	3.2	×	<u>2.3</u>	1.2	3.1	<u>2.3</u>	0 → (M, I) ← 0
3.2	1.1	2.1	1.1	×	<u>1.1</u>	<u>1.2</u>	<u>1.1</u>	2.3	(M, M, M) → 0
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	2.1	2.1	1.3	×	3.1	<u>1.2</u>	<u>1.2</u>	2.3	I ← (M, M) → 0
3.2	1.1	2.1	1.1	×	<u>1.1</u>	<u>1.2</u>	<u>1.1</u>	2.3	(M, M, M) → 0
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	2.3	2.1	3.1	×	<u>1.3</u>	<u>1.2</u>	3.2	2.3	(M, M) → (I, 0)
3.2	1.1	2.1	1.1	×	<u>1.1</u>	<u>1.2</u>	<u>1.1</u>	2.3	(M, M, M) → 0
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	3.1	2.1	1.2	×	<u>2.1</u>	<u>1.2</u>	<u>1.3</u>	<u>2.3</u>	0 ← (M, M) → 0

3.2	1.1	2.1	1.1	×	<u>1.1</u>	<u>1.2</u>	<u>1.1</u>	2.3	(M, M, M) → 0
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	3.2	2.1	2.1	×	<u>1.2</u>	<u>1.2</u>	<u>2.3</u>	<u>2.3</u>	(M, M) ↔ (0, 0)
M-them. 0 + ER									
3.2	1.1	2.1	1.2	×	<u>2.1</u>	<u>1.2</u>	<u>1.1</u>	<u>2.3</u>	0 → (M, M) ← 0
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	1.2	2.1	2.3	×	3.2	1.2	<u>2.1</u>	<u>2.3</u>	(I, M) ← (0, 0)
3.2	1.1	2.1	1.2	×	<u>2.1</u>	<u>1.2</u>	<u>1.1</u>	<u>2.3</u>	0 → (M, M) ← 0
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	1.3	2.1	3.2	×	<u>2.3</u>	1.2	3.1	<u>2.3</u>	0 → (M, I) ← 0
3.2	1.2	2.1	2.1	×	<u>1.2</u>	<u>1.2</u>	<u>2.1</u>	<u>2.3</u>	(M, M) ↔ (0, 0)
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	1.2	2.1	2.3	×	3.2	1.2	<u>2.1</u>	<u>2.3</u>	(I, M) ← (0, 0)
3.2	1.2	2.1	2.1	×	<u>1.2</u>	<u>1.2</u>	<u>2.1</u>	<u>2.3</u>	(M, M) ↔ (0, 0)
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	1.3	2.1	3.2	×	<u>2.3</u>	1.2	3.1	<u>2.3</u>	0 → (M, I) ← 0
3.2	2.1	2.1	1.1	×	<u>1.1</u>	<u>1.2</u>	<u>1.2</u>	2.3	(M, M, M) → 0
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	1.2	2.1	2.3	×	3.2	1.2	<u>2.1</u>	<u>2.3</u>	(I, M) ← (0, 0)
3.2	2.1	2.1	1.1	×	<u>1.1</u>	<u>1.2</u>	<u>1.2</u>	2.3	(M, M, M) → 0
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	1.3	2.1	3.2	×	<u>2.3</u>	1.2	3.1	<u>2.3</u>	0 → (M, I) ← 0

3.2 2.1 2.1 1.1 × 1.1 1.2 1.2 2.3 (M, M, M) → 0
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 2.1 2.1 1.3 × 3.1 1.2 1.2 2.3 I ← (M, M) → 0

3.2 2.1 2.1 1.1 × 1.1 1.2 1.2 2.3 (M, M, M) → 0
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 2.3 2.1 3.1 × 1.3 1.2 3.2 2.3 (M, M) → (I, 0)

3.2 2.1 2.1 1.1 × 1.1 1.2 1.2 2.3 (M, M, M) → 0
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 3.1 2.1 1.2 × 2.1 1.2 1.3 2.3 0 ← (M, M) → 0

3.2 2.1 2.1 1.1 × 1.1 1.2 1.2 2.3 (M, M, M) → 0
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 3.2 2.1 2.1 × 1.2 1.2 2.3 2.3 (M, M) ↔ (0, 0)

M-them. I + ER

3.2 1.1 2.1 1.3 × 3.1 1.2 1.1 2.3 I ← (M, M) → 0
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 1.2 2.1 2.3 × 3.2 1.2 2.1 2.3 (I, M) ← (0, 0)

3.2 1.1 2.1 1.3 × 3.1 1.2 1.1 2.3 I ← (M, M) → 0
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 1.3 2.1 3.2 × 2.3 1.2 3.1 2.3 0 → (M, I) ← 0

3.2 1.3 2.1 3.1 × 1.3 1.2 3.1 2.3 (M, M) → (I, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 1.2 2.1 2.3 × 3.2 1.2 2.1 2.3 (I, M) ← (0, 0)

3.2	1.3	2.1	3.1	×	<u>1.3</u>	<u>1.2</u>	3.1	2.3	(M, M) → (I, 0)
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	1.3	2.1	3.2	×	<u>2.3</u>	1.2	3.1	<u>2.3</u>	0 → (M, I) ← 0
3.2	3.1	2.1	1.1	×	<u>1.1</u>	<u>1.2</u>	<u>1.3</u>	2.3	(M, M, M) → 0
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	1.2	2.1	2.3	×	3.2	1.2	<u>2.1</u>	<u>2.3</u>	(I, M) ← (0, 0)
3.2	3.1	2.1	1.1	×	<u>1.1</u>	<u>1.2</u>	<u>1.3</u>	2.3	(M, M, M) → 0
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	1.3	2.1	3.2	×	<u>2.3</u>	1.2	3.1	<u>2.3</u>	0 → (M, I) ← 0
3.2	3.1	2.1	1.1	×	<u>1.1</u>	<u>1.2</u>	<u>1.3</u>	2.3	(M, M, M) → 0
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	2.1	2.1	1.3	×	3.1	<u>1.2</u>	<u>1.2</u>	2.3	I ← (M, M) → 0
3.2	3.1	2.1	1.1	×	<u>1.1</u>	<u>1.2</u>	<u>1.3</u>	2.3	(M, M, M) → 0
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	2.3	2.1	3.1	×	<u>1.3</u>	<u>1.2</u>	3.2	2.3	(M, M) → (I, 0)
3.2	3.1	2.1	1.1	×	<u>1.1</u>	<u>1.2</u>	<u>1.3</u>	2.3	(M, M, M) → 0
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	3.1	2.1	1.2	×	<u>2.1</u>	<u>1.2</u>	<u>1.3</u>	<u>2.3</u>	0 ← (M, M) → 0
3.2	3.1	2.1	1.1	×	<u>1.1</u>	<u>1.2</u>	<u>1.3</u>	2.3	(M, M, M) → 0
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	3.2	2.1	2.1	×	<u>1.2</u>	<u>1.2</u>	<u>2.3</u>	<u>2.3</u>	(M, M) ↔ (0, 0)

O-them. M + ER

3.2	1.2	2.1	2.2	×	<u>2.2</u>	1.2	<u>2.1</u>	<u>2.3</u>	$0 \rightarrow M \leftarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	2.1	2.1	1.3	×	3.1	<u>1.2</u>	<u>1.2</u>	2.3	$I \leftarrow (M, M) \rightarrow 0$
3.2	1.2	2.1	2.2	×	<u>2.2</u>	1.2	<u>2.1</u>	<u>2.3</u>	$0 \rightarrow M \leftarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	2.3	2.1	3.1	×	<u>1.3</u>	<u>1.2</u>	3.2	2.3	$(M, M) \rightarrow (I, 0)$
3.2	1.2	2.1	2.2	×	<u>2.2</u>	1.2	<u>2.1</u>	<u>2.3</u>	$0 \rightarrow M \leftarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	3.1	2.1	1.2	×	<u>2.1</u>	<u>1.2</u>	<u>1.3</u>	<u>2.3</u>	$0 \leftarrow (M, M) \rightarrow 0$
3.2	1.2	2.1	2.2	×	<u>2.2</u>	1.2	<u>2.1</u>	<u>2.3</u>	$0 \rightarrow M \leftarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	3.2	2.1	2.1	×	<u>1.2</u>	<u>1.2</u>	<u>2.3</u>	<u>2.3</u>	$(M, M) \leftrightarrow (0, 0)$
3.2	2.1	2.1	1.2	×	<u>2.1</u>	<u>1.2</u>	<u>1.2</u>	<u>2.3</u>	$0 \leftarrow (M, M) \rightarrow 0$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	1.2	2.1	2.3	×	3.2	1.2	<u>2.1</u>	<u>2.3</u>	$(I, M) \leftarrow (0, 0)$
3.2	2.1	2.1	1.2	×	<u>2.1</u>	<u>1.2</u>	<u>1.2</u>	<u>2.3</u>	$0 \leftarrow (M, M) \rightarrow 0$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	1.3	2.1	3.2	×	<u>2.3</u>	1.2	3.1	<u>2.3</u>	$0 \rightarrow (M, I) \leftarrow 0$

3.2 2.2 2.1 2.1 × 1.2 1.2 2.2 2.3 (M, M) ↔ (0, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 1.2 2.1 2.3 × 3.2 1.2 2.1 2.3 (I, M) ← (0, 0)

3.2 2.2 2.1 2.1 × 1.2 1.2 2.2 2.3 (M, M) ↔ (0, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 1.3 2.1 3.2 × 2.3 1.2 3.1 2.3 0 → (M, I) ← 0

O-them. 0

3.2 2.2 2.1 2.2 × 2.2 1.2 2.2 2.3 0 → M ← (0, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 2.1 2.1 1.3 × 3.1 1.2 1.2 2.3 I ← (M, M) → 0

3.2 2.2 2.1 2.2 × 2.2 1.2 2.2 2.3 0 → M ← (0, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 2.3 2.1 3.1 × 1.3 1.2 3.2 2.3 (M, M) → (I, 0)

3.2 2.2 2.1 2.2 × 2.2 1.2 2.2 2.3 0 → M ← (0, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 3.1 2.1 1.2 × 2.1 1.2 1.3 2.3 0 ← (M, M) → 0

3.2 2.2 2.1 2.2 × 2.2 1.2 2.2 2.3 0 → M ← (0, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 3.2 2.1 2.1 × 1.2 1.2 2.3 2.3 (M, M) ↔ (0, 0)

O-them. I + ER

3.2 2.2 2.1 2.3 × 3.2 1.2 2.2 2.3 (I, M) ← (0, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 2.3 2.1 3.1 × 1.3 1.2 3.2 2.3 (M, M) → (I, 0)

3.2	2.2	2.1	2.3	×	3.2	1.2	<u>2.2</u>	<u>2.3</u>	$(I, M) \leftarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	3.1	2.1	1.2	×	<u>2.1</u>	<u>1.2</u>	<u>1.3</u>	<u>2.3</u>	$0 \leftarrow (M, M) \rightarrow 0$
3.2	2.2	2.1	2.3	×	3.2	1.2	<u>2.2</u>	<u>2.3</u>	$(I, M) \leftarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	3.2	2.1	2.1	×	<u>1.2</u>	<u>1.2</u>	<u>2.3</u>	<u>2.3</u>	$(M, M) \leftrightarrow (0, 0)$
3.2	2.3	2.1	3.2	×	<u>2.3</u>	1.2	3.2	<u>2.3</u>	$0 \rightarrow (M, I) \leftarrow 0$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	2.1	2.1	1.3	×	3.1	<u>1.2</u>	<u>1.2</u>	2.3	$I \leftarrow (M, M) \rightarrow 0$
3.2	2.3	2.1	3.2	×	<u>2.3</u>	1.2	3.2	<u>2.3</u>	$0 \rightarrow (M, I) \leftarrow 0$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	2.3	2.1	3.1	×	<u>1.3</u>	<u>1.2</u>	3.2	2.3	$(M, M) \rightarrow (I, 0)$
3.2	2.3	2.1	3.2	×	<u>2.3</u>	1.2	3.2	<u>2.3</u>	$0 \rightarrow (M, I) \leftarrow 0$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	3.1	2.1	1.2	×	<u>2.1</u>	<u>1.2</u>	<u>1.3</u>	<u>2.3</u>	$0 \leftarrow (M, M) \rightarrow 0$
3.2	2.3	2.1	3.2	×	<u>2.3</u>	1.2	3.2	<u>2.3</u>	$0 \rightarrow (M, I) \leftarrow 0$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	3.2	2.1	2.1	×	<u>1.2</u>	<u>1.2</u>	<u>2.3</u>	<u>2.3</u>	$(M, M) \leftrightarrow (0, 0)$
3.2	3.2	2.1	2.2	×	<u>2.2</u>	1.2	<u>2.3</u>	<u>2.3</u>	$0 \rightarrow M \leftarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	2.1	2.1	1.3	×	3.1	<u>1.2</u>	<u>1.2</u>	2.3	$I \leftarrow (M, M) \rightarrow 0$

3.2 3.2 2.1 2.2 × 2.2 1.2 2.3 2.3 0 → M ← (0, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 2.3 2.1 3.1 × 1.3 1.2 3.2 2.3 (M, M) → (I, 0)

3.2 3.2 2.1 2.2 × 2.2 1.2 2.3 2.3 0 → M ← (0, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 3.1 2.1 1.2 × 2.1 1.2 1.3 2.3 0 ← (M, M) → 0

3.2 3.2 2.1 2.2 × 2.2 1.2 2.3 2.3 0 → M ← (0, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 3.2 2.1 2.1 × 1.2 1.2 2.3 2.3 (M, M) ↔ (0, 0)

I-them. M + ER

3.2 1.3 2.1 3.3 × 3.3 1.2 3.1 2.3 I → M ← (I, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 2.1 2.1 1.3 × 3.1 1.2 1.2 2.3 I ← (M, M) → 0

3.2 1.3 2.1 3.3 × 3.3 1.2 3.1 2.3 I → M ← (I, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 2.3 2.1 3.1 × 1.3 1.2 3.2 2.3 (M, M) → (I, 0)

3.2 1.3 2.1 3.3 × 3.3 1.2 3.1 2.3 I → M ← (I, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 3.1 2.1 1.2 × 2.1 1.2 1.3 2.3 0 ← (M, M) → 0

3.2 1.3 2.1 3.3 × 3.3 1.2 3.1 2.3 I → M ← (I, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 3.2 2.1 2.1 × 1.2 1.2 2.3 2.3 (M, M) ↔ (0, 0)

3.2 3.1 2.1 1.3 × 3.1 1.2 1.3 2.3 I ← (M, M) → 0
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 1.2 2.1 2.3 × 3.2 1.2 2.1 2.3 (I, M) ← (0, 0)

3.2 3.1 2.1 1.3 × 3.1 1.2 1.3 2.3 I ← (M, M) → 0
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 1.3 2.1 3.2 × 2.3 1.2 3.1 2.3 0 → (M, I) ← 0

3.2 3.3 2.1 3.1 × 1.3 1.2 3.3 2.3 (M, M) → (I, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 1.2 2.1 2.3 × 3.2 1.2 2.1 2.3 (I, M) ← (0, 0)

3.2 3.3 2.1 3.1 × 1.3 1.2 3.3 2.3 (M, M) → (I, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 1.3 2.1 3.2 × 2.3 1.2 3.1 2.3 0 → (M, I) ← 0

I-them. 0

3.2 2.3 2.1 3.3 × 3.3 1.2 3.2 2.3 I → M ← (I, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 2.1 2.1 1.3 × 3.1 1.2 1.2 2.3 I ← (M, M) → 0

3.2 2.3 2.1 3.3 × 3.3 1.2 3.2 2.3 I → M ← (I, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 2.3 2.1 3.1 × 1.3 1.2 3.2 2.3 (M, M) → (I, 0)

3.2 2.3 2.1 3.3 × 3.3 1.2 3.2 2.3 I → M ← (I, 0)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 3.1 2.1 1.2 × 2.1 1.2 1.3 2.3 0 ← (M, M) → 0

3.2	2.3	2.1	3.3	×	<u>3.3</u>	1.2	<u>3.2</u>	2.3	$I \rightarrow M \leftarrow (I, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	3.2	2.1	2.1	×	<u>1.2</u>	<u>1.2</u>	<u>2.3</u>	<u>2.3</u>	$(M, M) \leftrightarrow (0, 0)$
3.2	3.2	2.1	2.3	×	3.2	1.2	<u>2.3</u>	<u>2.3</u>	$(I, M) \leftarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	2.1	2.1	1.3	×	3.1	<u>1.2</u>	<u>1.2</u>	2.3	$I \leftarrow (M, M) \rightarrow 0$
3.2	3.2	2.1	2.3	×	3.2	1.2	<u>2.3</u>	<u>2.3</u>	$(I, M) \leftarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	2.3	2.1	3.1	×	<u>1.3</u>	<u>1.2</u>	3.2	2.3	$(M, M) \rightarrow (I, 0)$
3.2	3.2	2.1	2.3	×	3.2	1.2	<u>2.3</u>	<u>2.3</u>	$(I, M) \leftarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	3.1	2.1	1.2	×	<u>2.1</u>	<u>1.2</u>	<u>1.3</u>	<u>2.3</u>	$0 \leftarrow (M, M) \rightarrow 0$
3.2	3.2	2.1	2.3	×	3.2	1.2	<u>2.3</u>	<u>2.3</u>	$(I, M) \leftarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	3.2	2.1	2.1	×	<u>1.2</u>	<u>1.2</u>	<u>2.3</u>	<u>2.3</u>	$(M, M) \leftrightarrow (0, 0)$
3.2	3.3	2.1	3.2	×	<u>2.3</u>	1.2	3.3	<u>2.3</u>	$0 \rightarrow (M, I) \leftarrow 0$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	2.1	2.1	1.3	×	3.1	<u>1.2</u>	<u>1.2</u>	2.3	$I \leftarrow (M, M) \rightarrow 0$
3.2	3.3	2.1	3.2	×	<u>2.3</u>	1.2	3.3	<u>2.3</u>	$0 \rightarrow (M, I) \leftarrow 0$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	2.3	2.1	3.1	×	<u>1.3</u>	<u>1.2</u>	3.2	2.3	$(M, M) \rightarrow (I, 0)$

3.2 3.3 2.1 3.2 × 2.3 1.2 3.3 2.3 $0 \rightarrow (M, I) \leftarrow 0$
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3.2 3.1 2.1 1.2 × 2.1 1.2 1.3 2.3 $0 \leftarrow (M, M) \rightarrow 0$

3.2 3.3 2.1 3.2 × 2.3 1.2 3.3 2.3 $0 \rightarrow (M, I) \leftarrow 0$
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3.2 3.3 2.1 3.3 × 3.3 1.2 3.3 2.3 $I \rightarrow M \leftarrow (I, 0)$
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3.2 3.1 2.1 1.2 × 2.1 1.2 1.3 2.3 $0 \leftarrow (M, M) \rightarrow 0$

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3.2 3.2 2.1 2.1 × 1.2 1.2 2.3 2.3 $(M, M) \leftrightarrow (0, 0)$

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28.3.2026