

Die Selbstbezeichnung des Zeichens

1. Die Entwicklung der theoretischen Basis der Semiotik kann man schön anhand der folgenden drei Zitate aus Max Benses Werk nachvollziehen: „Zeichen ist alles, was zum Zeichen erklärt wird und nur was zum Zeichen erklärt wird“ (Bense 1967, S. 9). „Jedes beliebige Etwas kann zum Zeichen eines anderen Etwas erklärt werden. Jedes Zeichen kann zum Zeichen eines anderen Zeichens erklärt werden (Bense 1981, S. 172). „Ein Zeichen, das ein Etwas bezeichnet, bezeichnet stets auch sich selbst in seiner Eigenrealität, daher kann weiterhin im Prinzip jedes Etwas zum Zeichen für Anderes erklärt werden und besitzt jedes Zeichen ein vorangehendes wie auch ein nachfolgendes Zeichen“ (Bense 1992, S. 26). Die Begründung dafür, daß jedes Etwas zum Zeichen erklärt werden kann, nämlich die Fähigkeit des Zeichens, nicht nur anderes, sondern auch sich selbst zu bezeichnen, folgt also erst ein Vierteljahrhundert nach Benses erstem semiotischen Buch.

Im folgenden benutzen wir die in Toth (2026) konstruierten trajektischen Thematisationstypen, um die Selbstbezeichnung des Zeichens formal in ihrer ganzen Tragweite zu erfassen:

M-them. M

3.2 1.1 2.1 1.1 × 1.1 1.2 1.1 2.3 (M, M, M) → O

M-them. O

3.2 1.1 2.1 1.2 × 2.1 1.2 1.1 2.3 O → (M, M) ← O

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

3.2 2.1 2.1 1.1 × 1.1 1.2 1.2 2.3 (M, M, M) → O

M-them. I

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

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

3.2 3.1 2.1 1.1 × 1.1 1.2 1.3 2.3 (M, M, M) → O

O-them. M

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

3.2 2.1 2.1 1.2 × 2.1 1.2 1.2 2.3 O ← (M, M) → O

3.2 2.2 2.1 2.1 × 1.2 1.2 2.2 2.3 (M, M) ↔ (O, O)

O-them. 0

3.2 2.2 2.1 2.2 × 2.2 1.2 2.2 2.3 $0 \rightarrow M \leftarrow (0, 0)$

O-them. I

3.2 2.2 2.1 2.3 × 3.2 1.2 2.2 2.3 $(I, M) \leftarrow (0, 0)$

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

3.2 3.2 2.1 2.2 × 2.2 1.2 2.3 2.3 $0 \rightarrow M \leftarrow (0, 0)$

I-them. M

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

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

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

I-them. 0

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

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

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

I-them. I

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

ER Them.

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

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

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

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

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

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

2. Das System der Selbstbezeichnung des Zeichens

M-them. M + ER

3.2 1.1 2.1 1.1 × 1.1 1.2 1.1 2.3 $(M, M, M) \rightarrow 0$

↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

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

3.2 1.1 2.1 1.1 × 1.1 1.2 1.1 2.3 (M, M, M) → O

↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

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

3.2 1.1 2.1 1.1 × 1.1 1.2 1.1 2.3 (M, M, M) → O

↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

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

3.2 1.1 2.1 1.1 × 1.1 1.2 1.1 2.3 (M, M, M) → O

↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

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

3.2 1.1 2.1 1.1 × 1.1 1.2 1.1 2.3 (M, M, M) → O

↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

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

3.2 1.1 2.1 1.1 × 1.1 1.2 1.1 2.3 (M, M, M) → O

↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

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

M-them. O + ER

3.2 1.1 2.1 1.2 × 2.1 1.2 1.1 2.3 O → (M, M) ← O

↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

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

3.2	1.1	2.1	1.2	×	<u>2.1</u>	<u>1.2</u>	<u>1.1</u>	<u>2.3</u>	$0 \rightarrow (M, M) \leftarrow 0$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	1.1	2.1	1.2	×	<u>2.1</u>	<u>1.2</u>	<u>1.1</u>	<u>2.3</u>	$0 \rightarrow (M, M) \leftarrow 0$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	1.1	2.1	1.2	×	<u>2.1</u>	<u>1.2</u>	<u>1.1</u>	<u>2.3</u>	$0 \rightarrow (M, M) \leftarrow 0$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	1.1	2.1	1.2	×	<u>2.1</u>	<u>1.2</u>	<u>1.1</u>	<u>2.3</u>	$0 \rightarrow (M, M) \leftarrow 0$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	1.1	2.1	1.2	×	<u>2.1</u>	<u>1.2</u>	<u>1.1</u>	<u>2.3</u>	$0 \rightarrow (M, M) \leftarrow 0$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	1.2	2.1	2.1	×	<u>1.2</u>	<u>1.2</u>	<u>2.1</u>	<u>2.3</u>	$(M, M) \leftrightarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	1.2	2.1	2.1	×	<u>1.2</u>	<u>1.2</u>	<u>2.1</u>	<u>2.3</u>	$(M, M) \leftrightarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	1.2	2.1	2.1	×	<u>1.2</u>	<u>1.2</u>	<u>2.1</u>	<u>2.3</u>	$(M, M) \leftrightarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	2.1	×	<u>1.2</u>	<u>1.2</u>	<u>2.1</u>	<u>2.3</u>	$(M, M) \leftrightarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	2.1	×	<u>1.2</u>	<u>1.2</u>	<u>2.1</u>	<u>2.3</u>	$(M, M) \leftrightarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	2.1	×	<u>1.2</u>	<u>1.2</u>	<u>2.1</u>	<u>2.3</u>	$(M, M) \leftrightarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	1.1	×	<u>1.1</u>	<u>1.2</u>	<u>1.2</u>	2.3	$(M, M, M) \rightarrow 0$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	1.1	×	<u>1.1</u>	<u>1.2</u>	<u>1.2</u>	2.3	$(M, M, M) \rightarrow 0$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	2.1	2.1	1.1	×	<u>1.1</u>	<u>1.2</u>	<u>1.2</u>	2.3	$(M, M, M) \rightarrow 0$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	2.1	2.1	1.1	×	<u>1.1</u>	<u>1.2</u>	<u>1.2</u>	2.3	(M, M, M) → 0
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	2.3	2.1	3.1	×	<u>1.3</u>	<u>1.2</u>	3.2	2.3	(M, 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	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	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	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. I + ER									
3.2	1.1	2.1	1.3	×	3.1	<u>1.2</u>	<u>1.1</u>	2.3	I ← (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	1.3	×	3.1	<u>1.2</u>	<u>1.1</u>	2.3	I ← (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	1.3	×	3.1	<u>1.2</u>	<u>1.1</u>	2.3	I ← (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	1.3	×	3.1	<u>1.2</u>	<u>1.1</u>	2.3	I ← (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	1.3	×	3.1	<u>1.2</u>	<u>1.1</u>	2.3	$I \leftarrow (M, M) \rightarrow O$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	3.1	2.1	1.2	×	<u>2.1</u>	<u>1.2</u>	<u>1.3</u>	<u>2.3</u>	$O \leftarrow (M, M) \rightarrow O$
3.2	1.1	2.1	1.3	×	3.1	<u>1.2</u>	<u>1.1</u>	2.3	$I \leftarrow (M, M) \rightarrow O$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	3.2	2.1	2.1	×	<u>1.2</u>	<u>1.2</u>	<u>2.3</u>	<u>2.3</u>	$(M, M) \leftrightarrow (O, O)$

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

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

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) ← (O, O)
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, O)
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) ↔ (O, O)

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	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	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	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	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	2.1	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	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	2.1	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	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	2.1	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	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	2.1	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	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	2.2	2.1	2.1	×	<u>1.2</u>	<u>1.2</u>	<u>2.2</u>	<u>2.3</u>	$(M, M) \leftrightarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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 2.2 2.1 2.1 × 1.2 1.2 2.2 2.3 (M, M) ↔ (O, O)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

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

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

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 2.1 × 1.2 1.2 2.2 2.3 (M, M) ↔ (O, O)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

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

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

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 2.1 × 1.2 1.2 2.2 2.3 (M, M) ↔ (O, O)
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

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

O-them. 0

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

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

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

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

3.2	2.2	2.1	2.2	×	<u>2.2</u>	1.2	<u>2.2</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	2.2	2.1	2.2	×	<u>2.2</u>	1.2	<u>2.2</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	2.2	2.1	2.2	×	<u>2.2</u>	1.2	<u>2.2</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	2.2	2.1	2.2	×	<u>2.2</u>	1.2	<u>2.2</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>	$(M, M) \leftrightarrow (0, 0)$
O-them. I + ER									
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	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	2.2	2.1	2.3	×	3.2	1.2	<u>2.2</u>	<u>2.3</u>	$(I, M) \leftarrow (0, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	2.3	×	3.2	1.2	<u>2.2</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	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	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	2.2	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	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	2.3	2.1	3.2	×	<u>2.3</u>	1.2	3.2	<u>2.3</u>	$0 \rightarrow (M, I) \leftarrow 0$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	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	2.3	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	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	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	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	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	×	<u>2.2</u>	1.2	<u>2.3</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	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	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	2.2	×	<u>2.2</u>	1.2	<u>2.3</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>	$(M, M) \leftrightarrow (0, 0)$
I-them. M + ER									
3.2	1.3	2.1	3.3	×	<u>3.3</u>	1.2	<u>3.1</u>	2.3	$I \rightarrow M \leftarrow (I, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	1.3	2.1	3.3	×	<u>3.3</u>	1.2	<u>3.1</u>	2.3	$I \rightarrow M \leftarrow (I, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	1.3	2.1	3.3	×	<u>3.3</u>	1.2	<u>3.1</u>	2.3	$I \rightarrow M \leftarrow (I, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	1.3	2.1	3.3	×	<u>3.3</u>	1.2	<u>3.1</u>	2.3	$I \rightarrow M \leftarrow (I, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	1.3	2.1	3.3	×	<u>3.3</u>	1.2	<u>3.1</u>	2.3	$I \rightarrow M \leftarrow (I, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	1.3	2.1	3.3	×	<u>3.3</u>	1.2	<u>3.1</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 3.1 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 3.1 2.1 1.3 × 3.1 1.2 1.3 2.3 I ← (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 3.1 2.1 1.3 × 3.1 1.2 1.3 2.3 I ← (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 3.1 2.1 1.3 × 3.1 1.2 1.3 2.3 I ← (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 3.1 2.1 1.3 × 3.1 1.2 1.3 2.3 I ← (M, M) → 0
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 3.2 2.1 2.1 × 1.2 1.2 2.3 2.3 (M, 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 1.2 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

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

↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

3.2 3.2 2.1 2.1 × 1.2 1.2 2.3 2.3 (M, M) ↔ (0, 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 1.2 2.1 2.3 × 3.2 1.2 2.1 2.3 (I, M) ← (0, 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	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	2.3	2.1	3.3	×	<u>3.3</u>	1.2	<u>3.2</u>	2.3	$I \rightarrow M \leftarrow (I, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2	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	3.3	×	<u>3.3</u>	1.2	<u>3.2</u>	2.3	$I \rightarrow M \leftarrow (I, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	3.3	×	<u>3.3</u>	1.2	<u>3.2</u>	2.3	$I \rightarrow M \leftarrow (I, 0)$
↓	↓	↓	↓		↓	↓	↓	↓	↓
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	3.3	×	<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	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	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	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	3.2	2.1	2.3	×	3.2	1.2	<u>2.3</u>	<u>2.3</u>	(I, M) ← (0, 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	3.2	2.1	2.3	×	3.2	1.2	<u>2.3</u>	<u>2.3</u>	(I, M) ← (0, 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	3.2	2.1	2.3	×	3.2	1.2	<u>2.3</u>	<u>2.3</u>	(I, M) ← (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 ← (M, M) → 0
3.2	3.2	2.1	2.3	×	3.2	1.2	<u>2.3</u>	<u>2.3</u>	(I, M) ← (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) ↔ (0, 0)

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

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