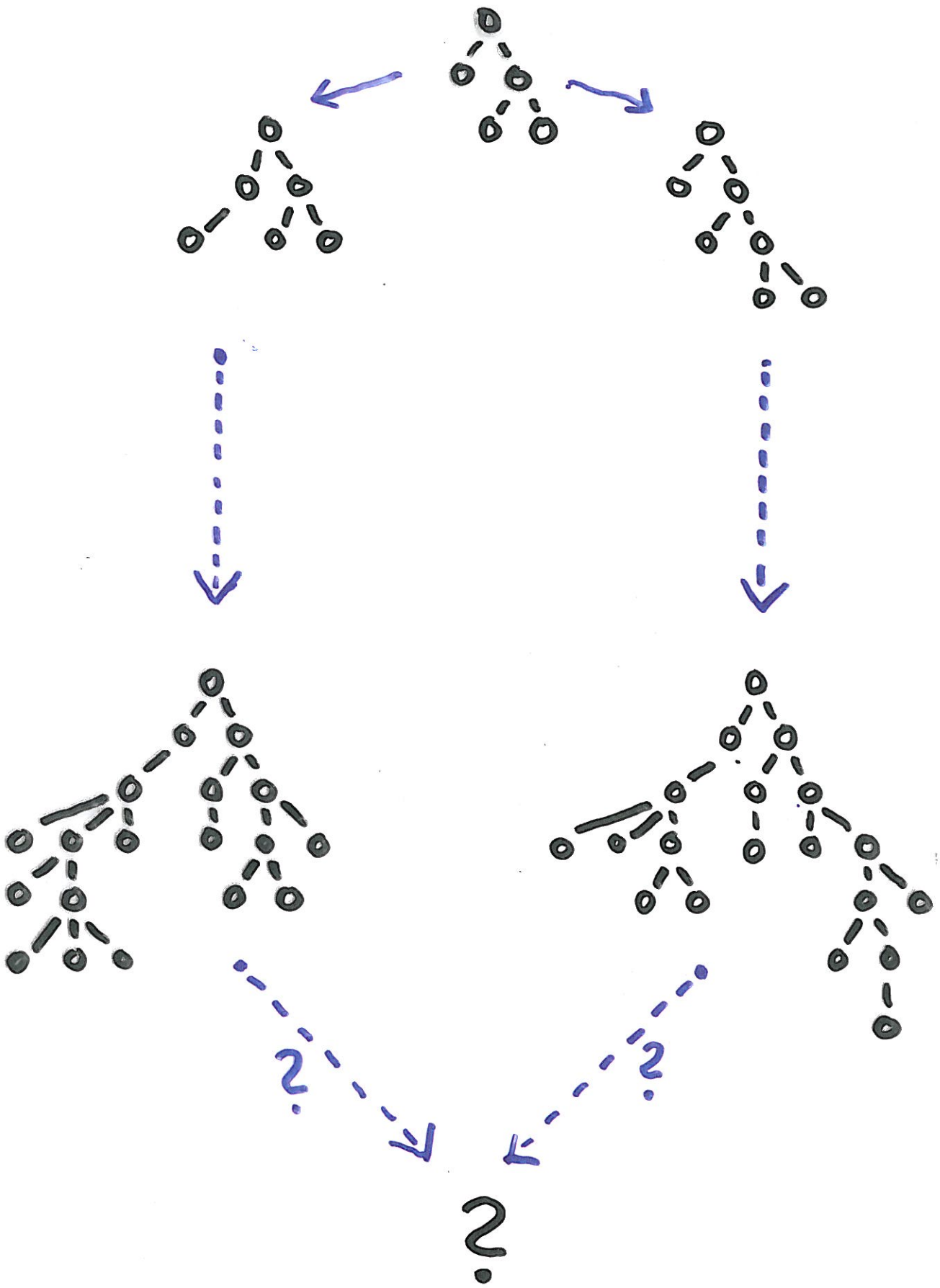
MENU FOR PART TWO

4. Confluence
5. Progressiveness
   - weak
   - strong
   - distributive
6. Basics on soundness
   - no other constraint than soundness is imposed on the letter-refiner
   - normal belt-selectors can be used in the construction of sound frames

CONFLUENCE



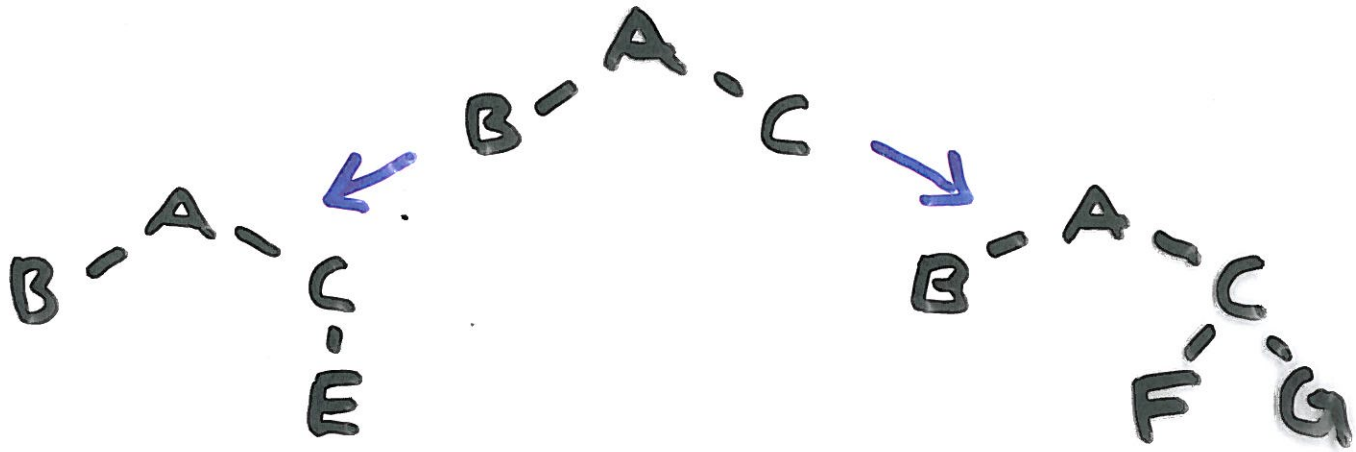
WHAT MAY DISRUPT CONFLUENCE?

POSSIBLE SOURCES OF NONDETERMINISM:

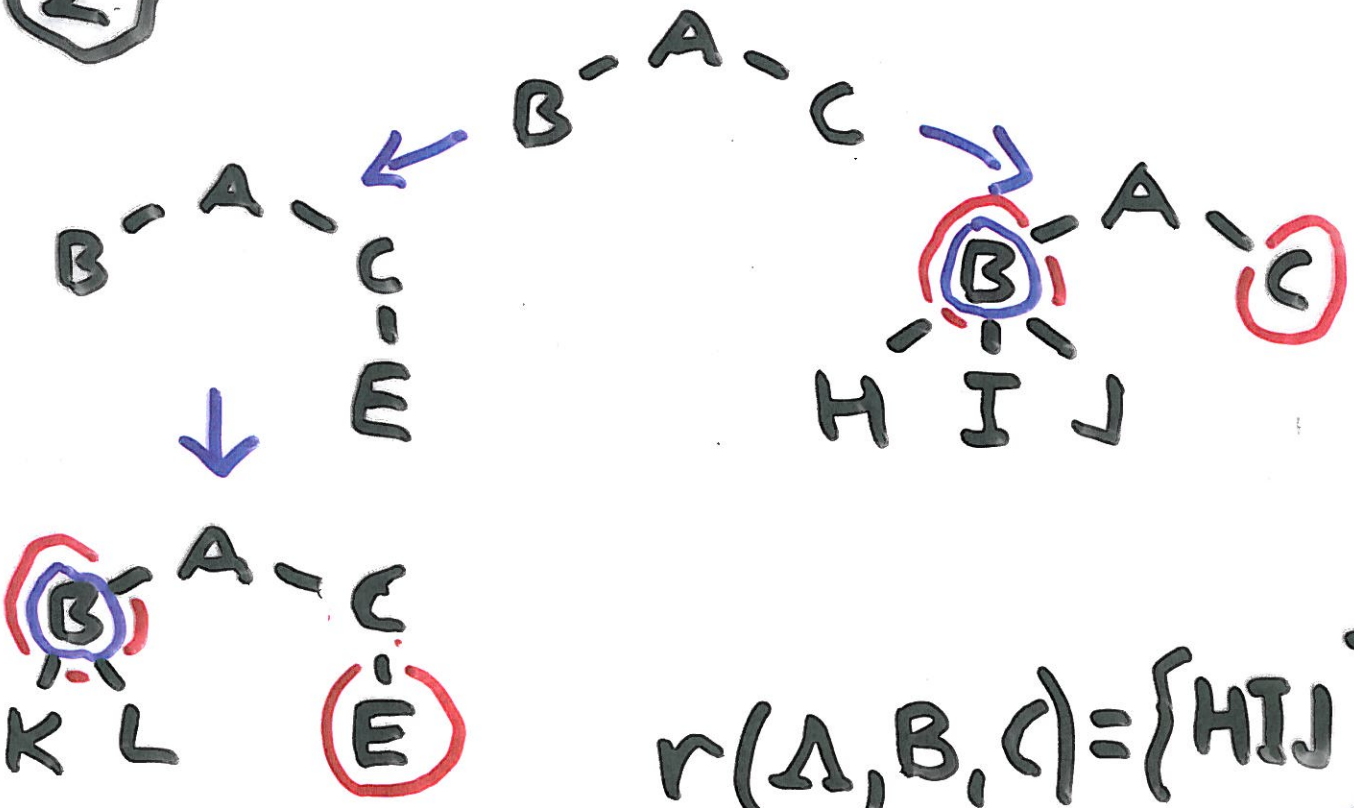
① letter-refiner may be non-deterministic

② several leaves may be fertile at the same time

① $r(B, C, A) = \{E, F, G\}$



②



$r(A, B, C) = \{H, I, J\}$

$r(A, B, E) = \{K, L\}$

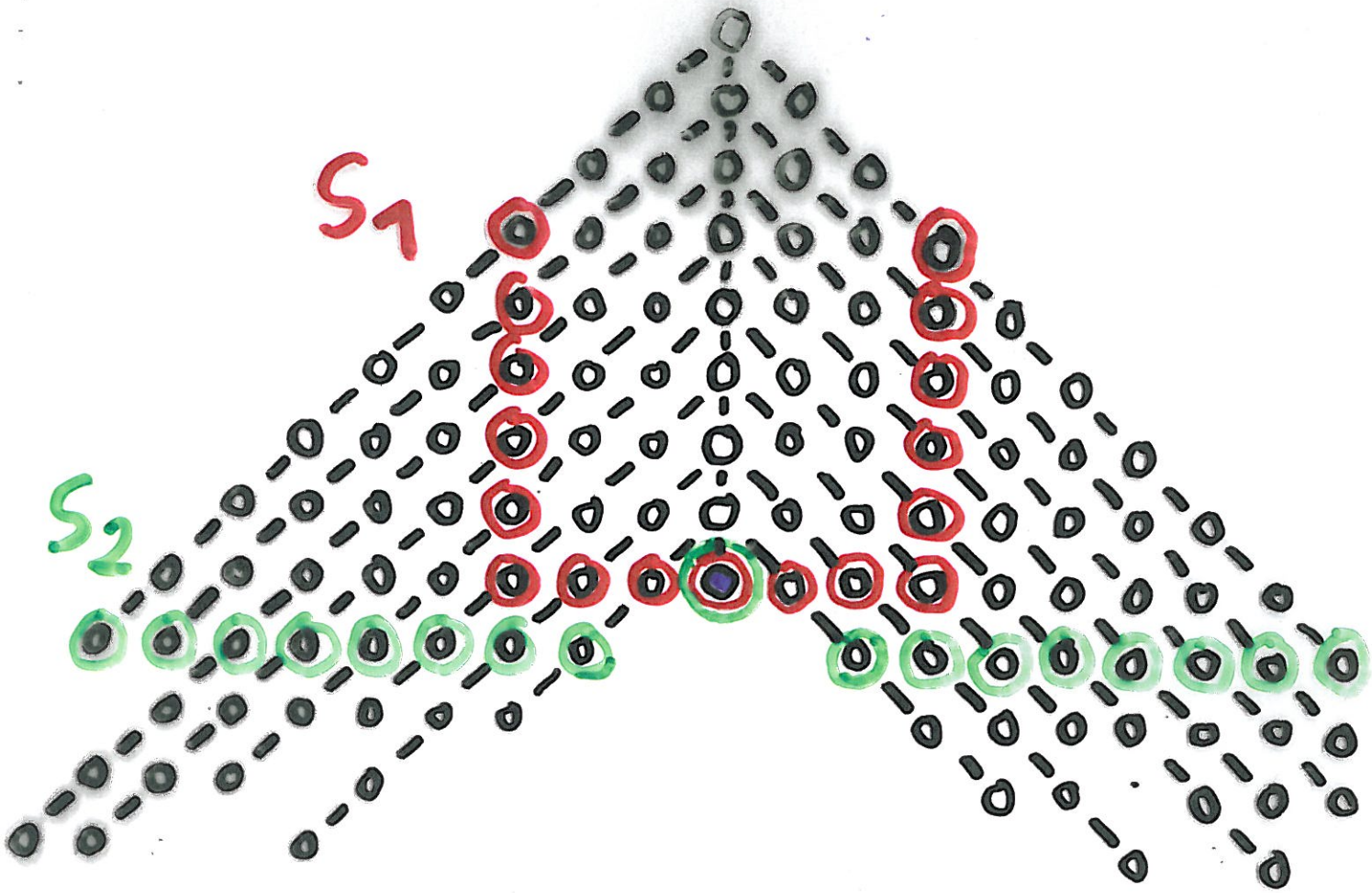
Suppose – first – that letter-refiner is deterministic.
Then we have confluence if

$$\forall i: \quad \varphi_{s_1}(i) \geq \varphi_{s_2}(i)$$

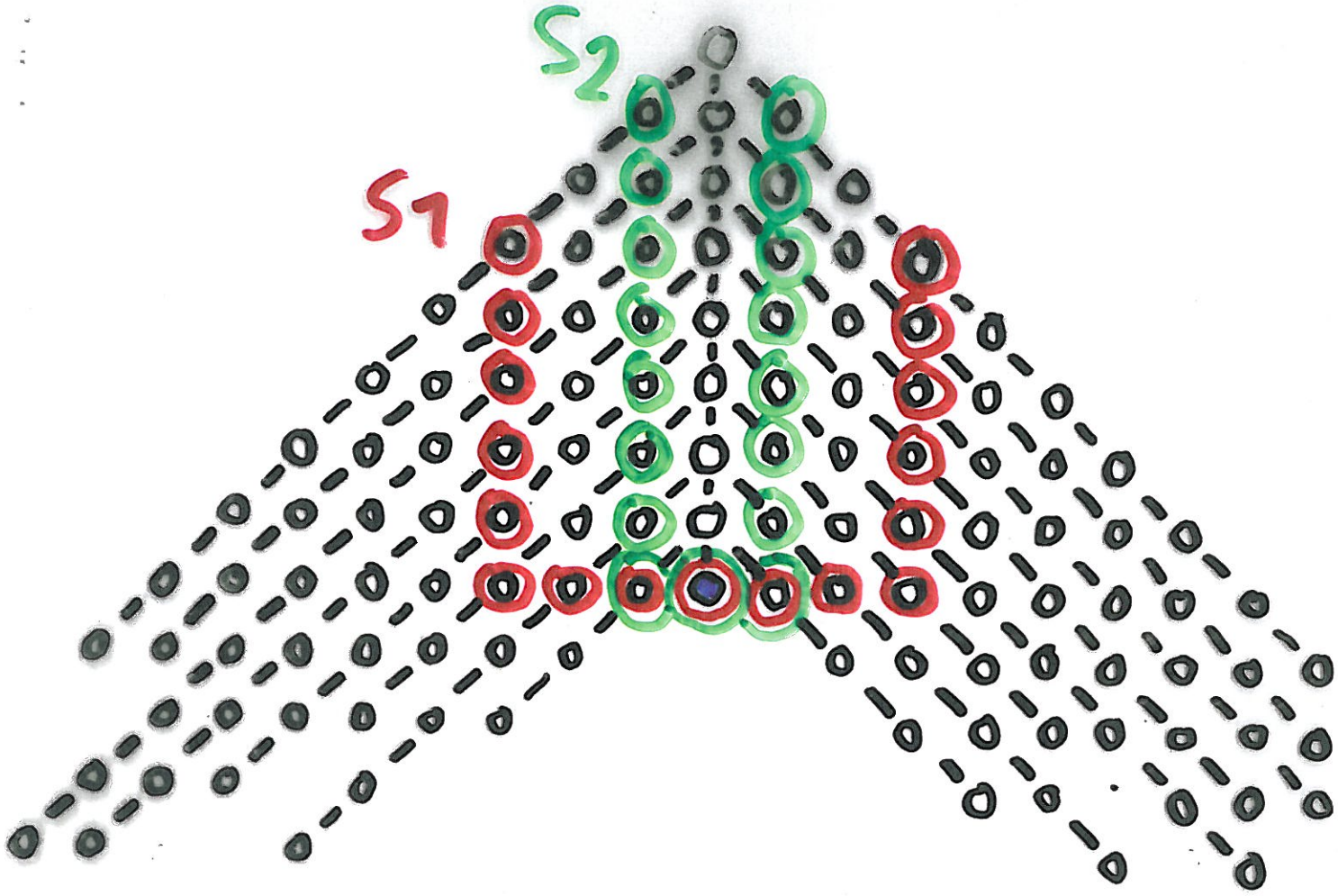
– In particular,

$$s_1 = s_2$$

is obviously sufficient



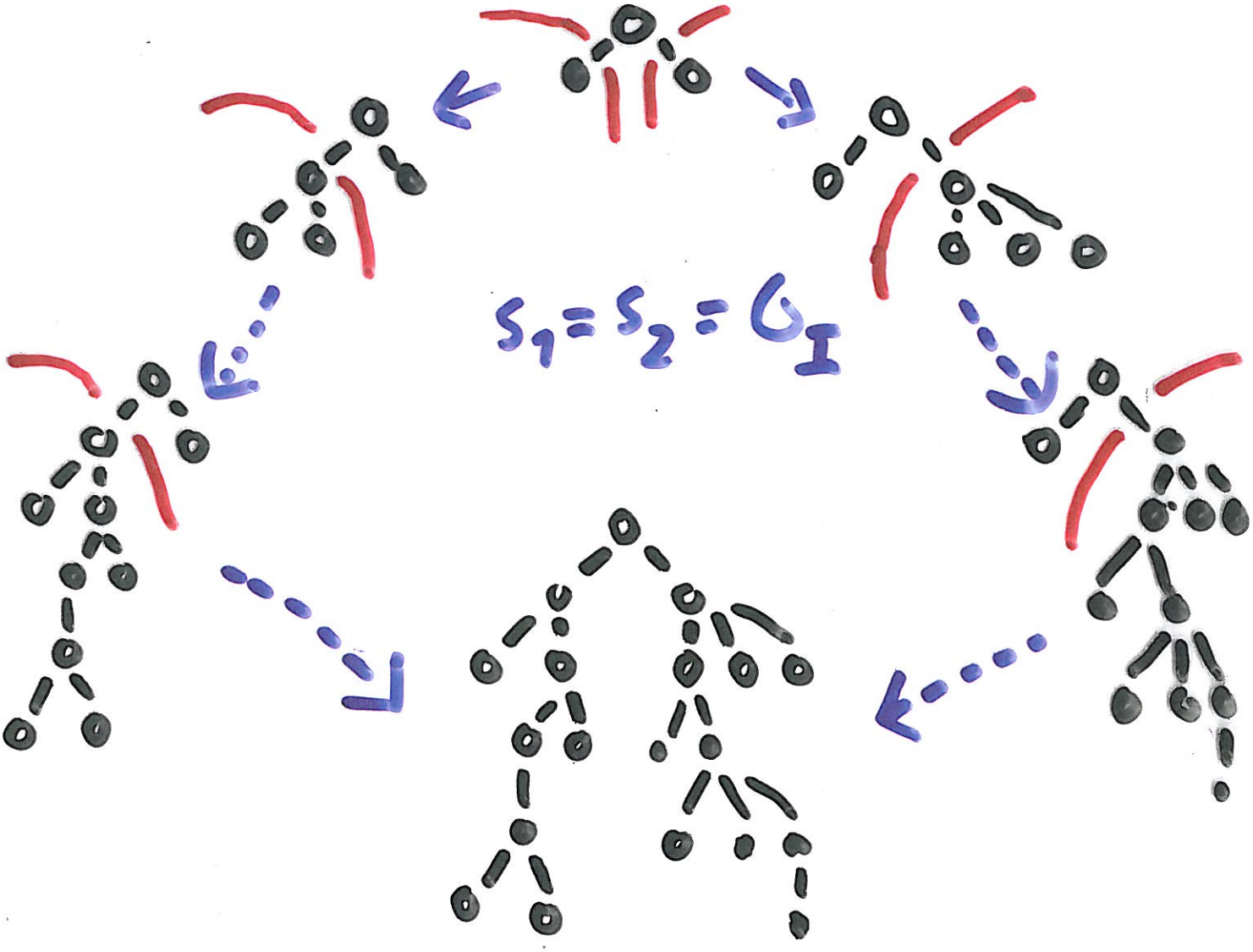
Possibly
non-confluent!



Confluent !

Second – how to deal with letter-refiner nondeterminism?

IN PRACTICE: We just use some simple bookkeeping



- **macro processors:**
  confluent because letter-refiner is deterministic and frame is equivalent to $\langle G_E \| G_I, G_E \| G_I, G_E, G_E \rangle$
- **context-sensitive Chomsky grammars and pure grammars:**
  not confluent because $\forall i: \varphi_{s_1}(i) < \varphi_{s_2}(i)$ as $s_1 = G_I$ and $s_2 = G_E$
- **L systems:**
  possibly confluent as $s_1 = G_C = s_2$! depending on the letter-refiner