

CHAPMAN UNIVERSITY  
GROTHENDIECK CONFERENCE

CATEGORY THEORY, TOPOSES, AND LOGIC: GROTHENDIECK'S APPROACH TO MATHEMATICS

24-28 May 2022

**A UNITARY VISION OF  
GROTHENDIECK'S 40 MAIN YEARS (1951-1991):  
THE MODELS TSK (TOPOS OF SHEAVES OVER KRIPKE MODELS)**

Fernando Zalamea  
Departamento de Matemáticas  
Universidad Nacional de Colombia

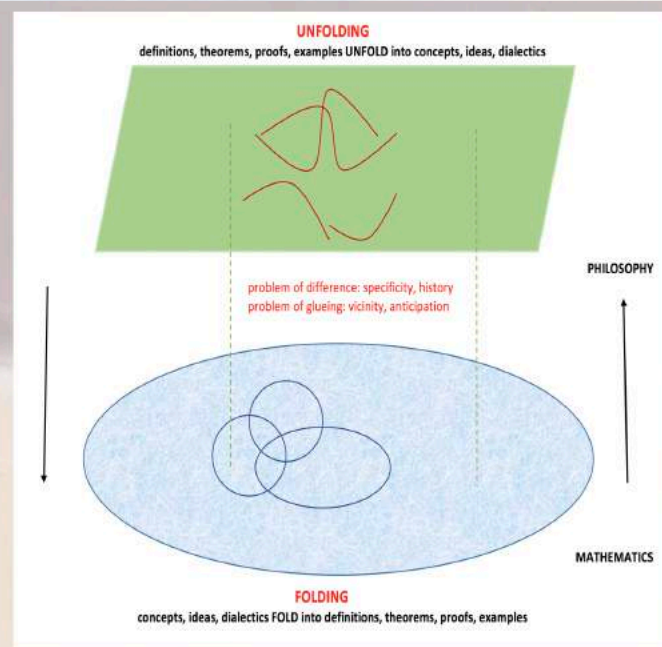
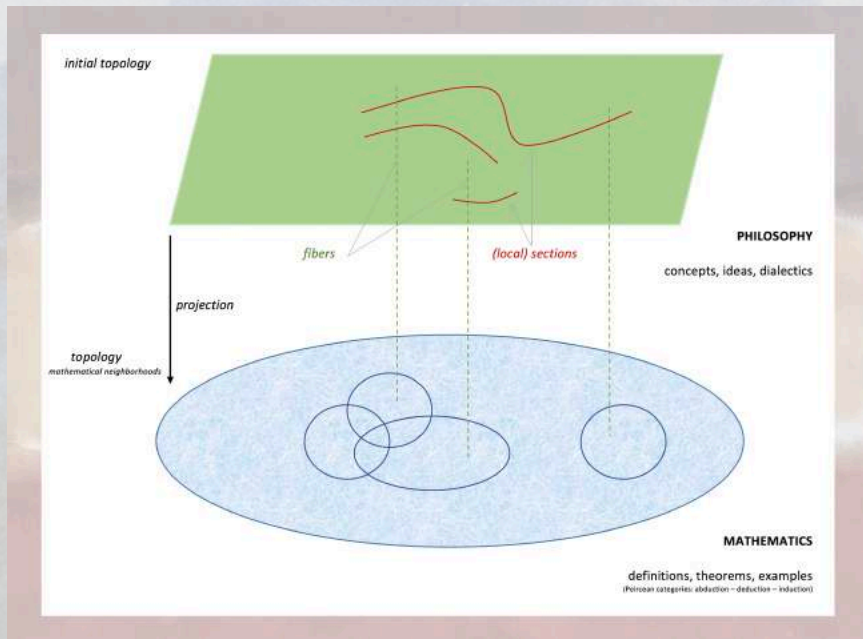
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## REFERENCES

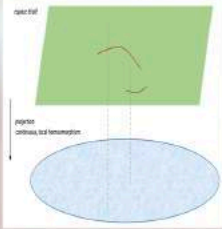


# 1.1. Mathematical Thought as a Sheaf (S)

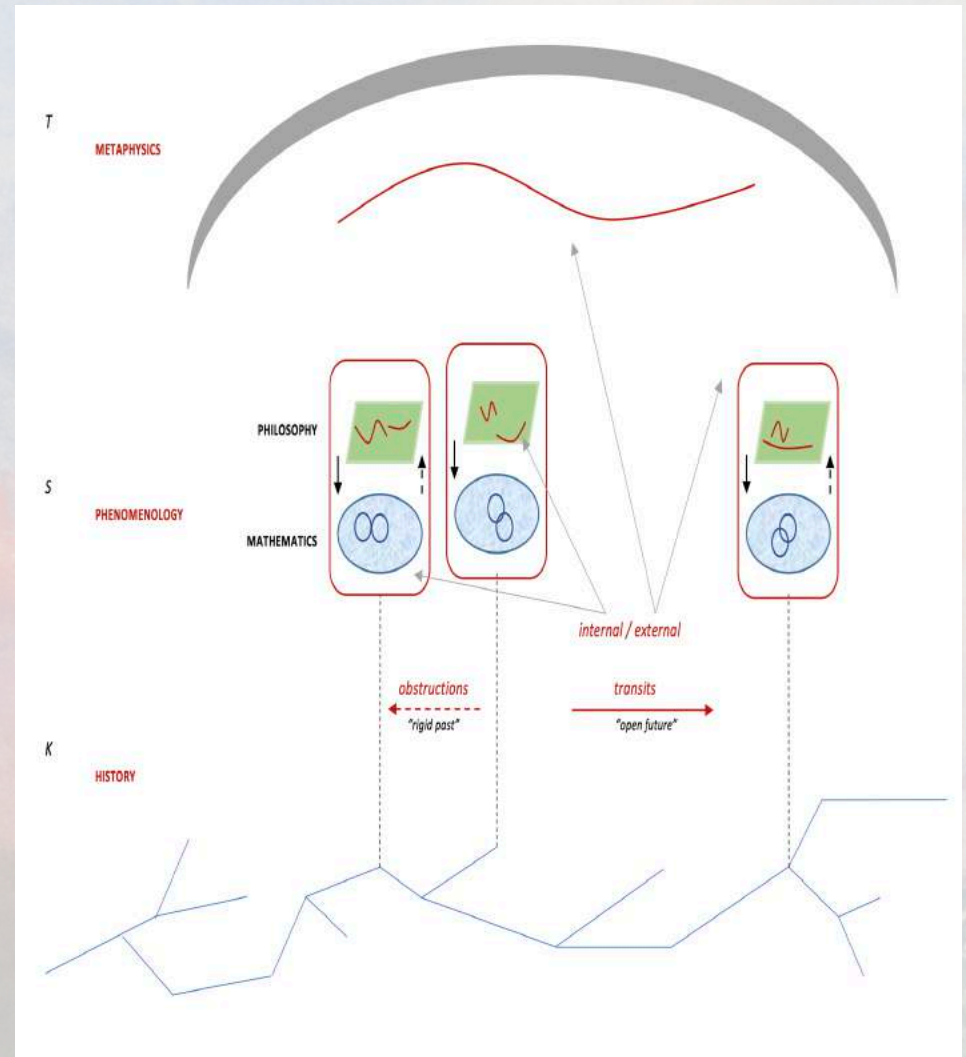
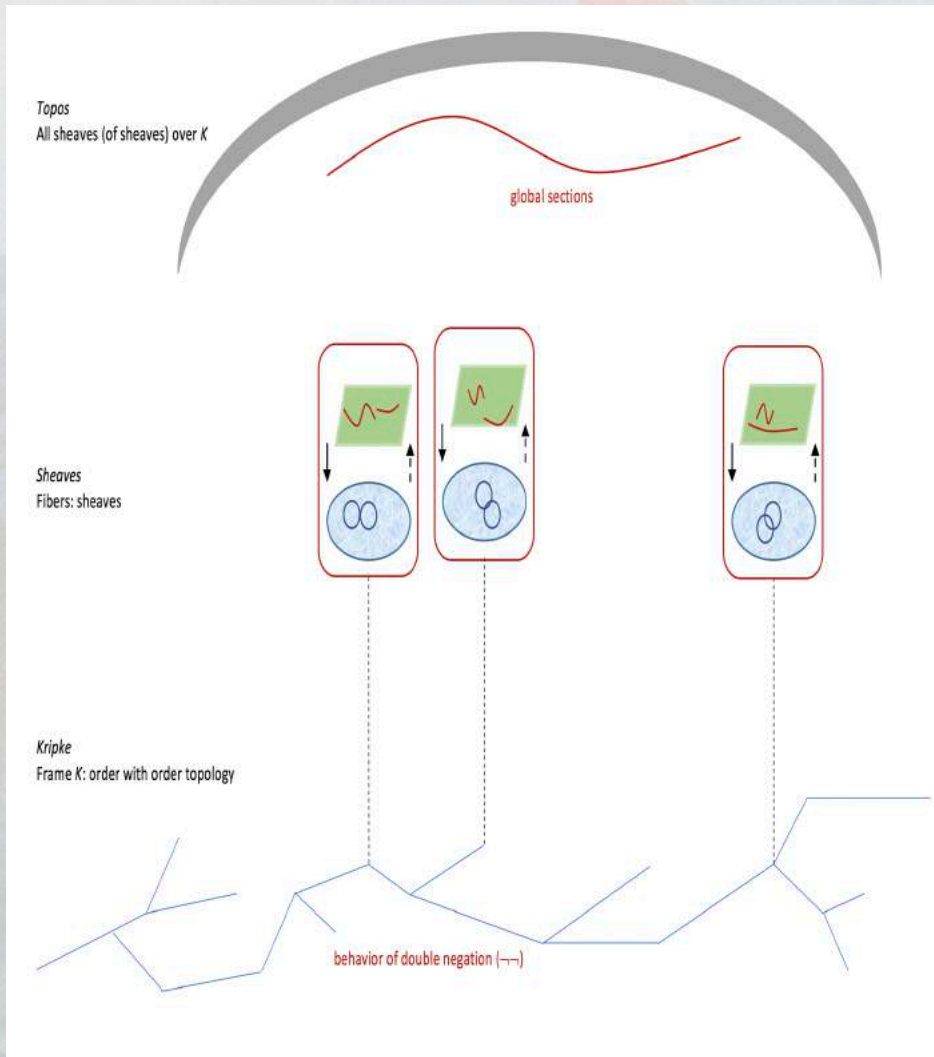


*taking the projection seriously*

1. projection  
fibers are *non-empty*: ideas exist always beyond techniques  
mathematics is a form of thought
2. continuous  
networks of ideas are always *open* to new creative ways
3. local homeomorphism  
Leibniz's dream:  
an idea in a fiber can be bounded enough so that its technical folding *captures fully* its philosophical ground  
Peirce's dream:  
mathematical symbols *capture fully* the unfolding differences between concepts/ideas



## 1.2. Topos of Sheaves over Kripke Models (TSK)

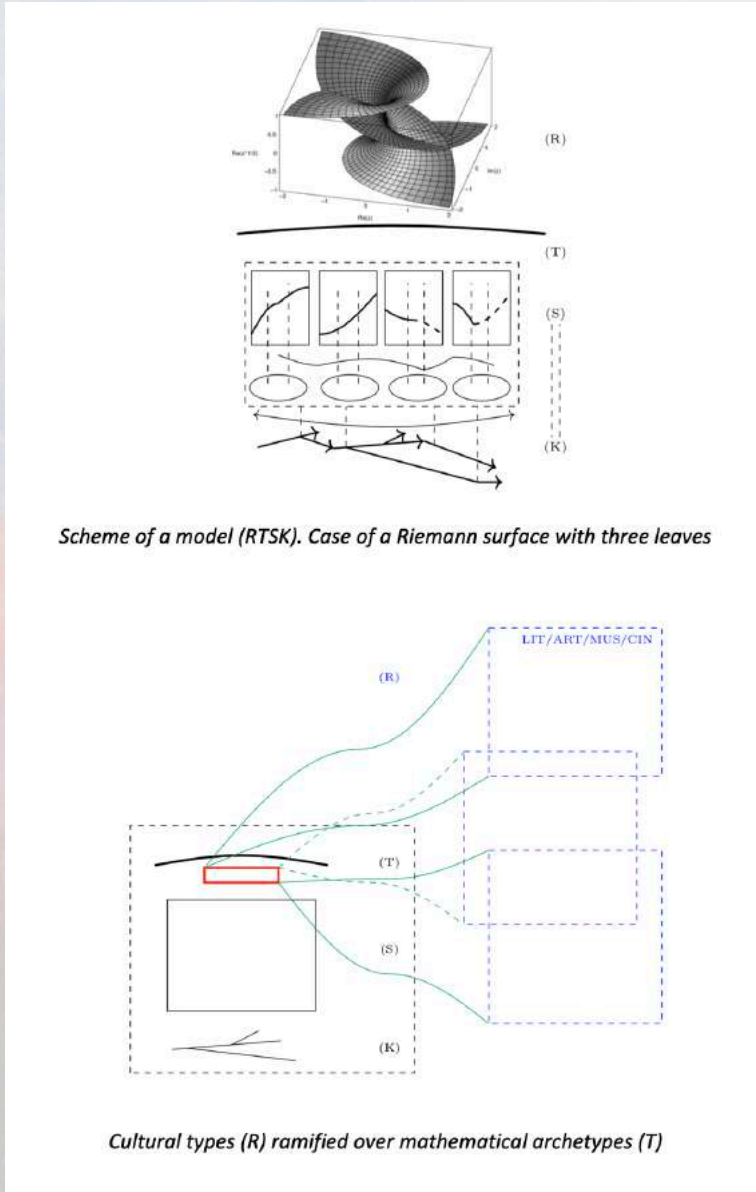
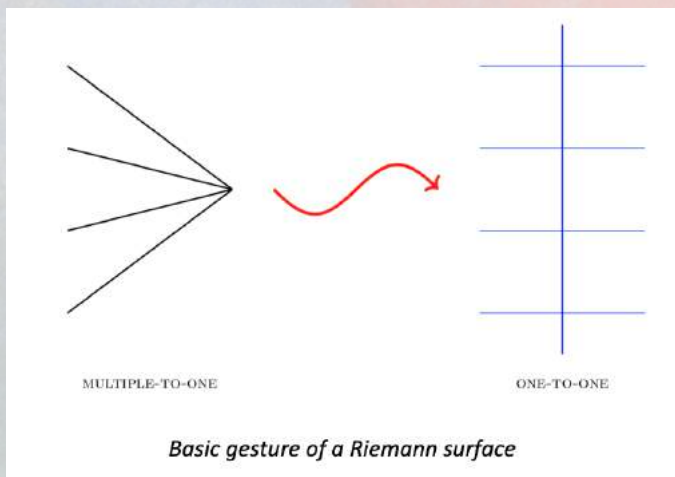




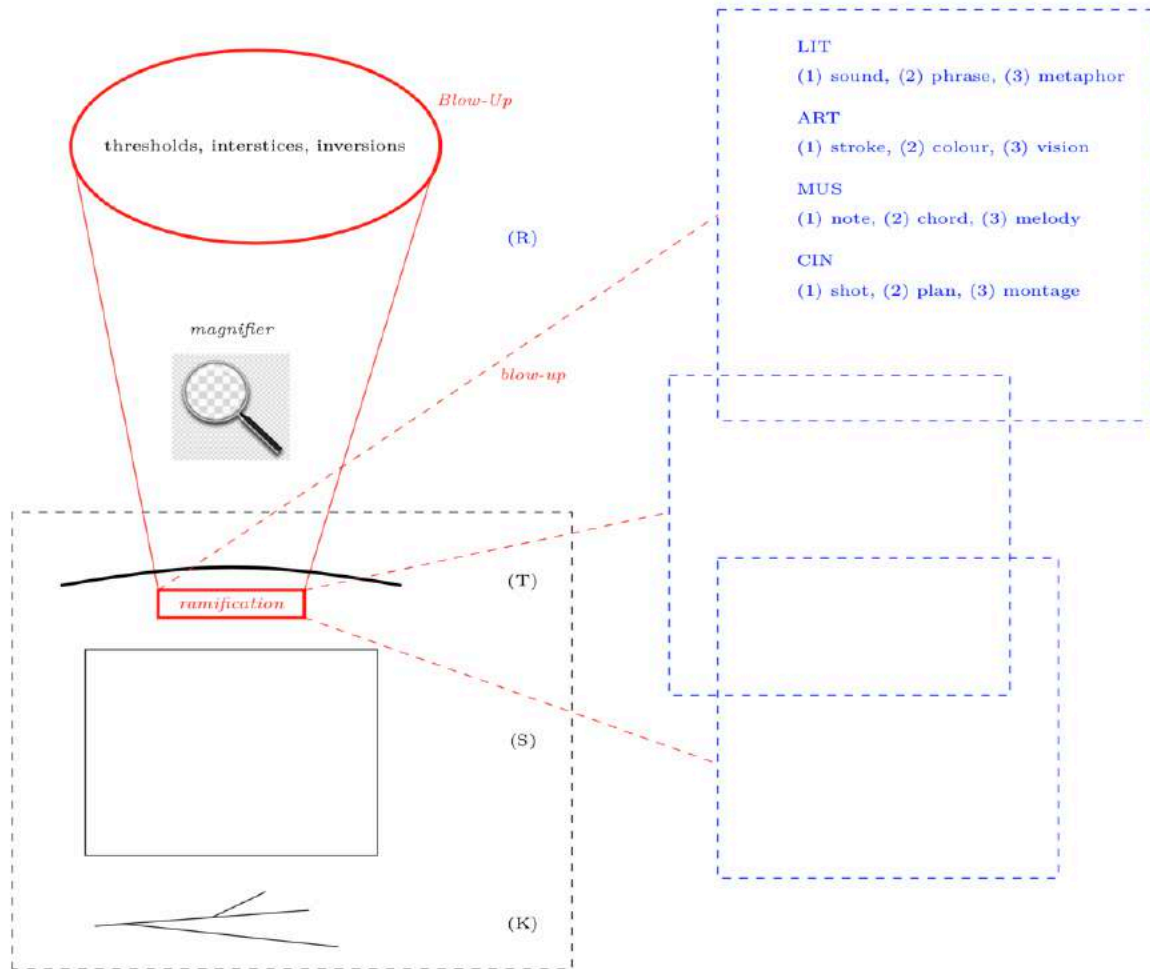
# 1.3. Riemann Surfaces over Topos of Sheaves over Kripke Models (RTSK)



Riemann surfaces for the quadratic and cubic roots (Brill models, c. 1900; IHP, Paris)



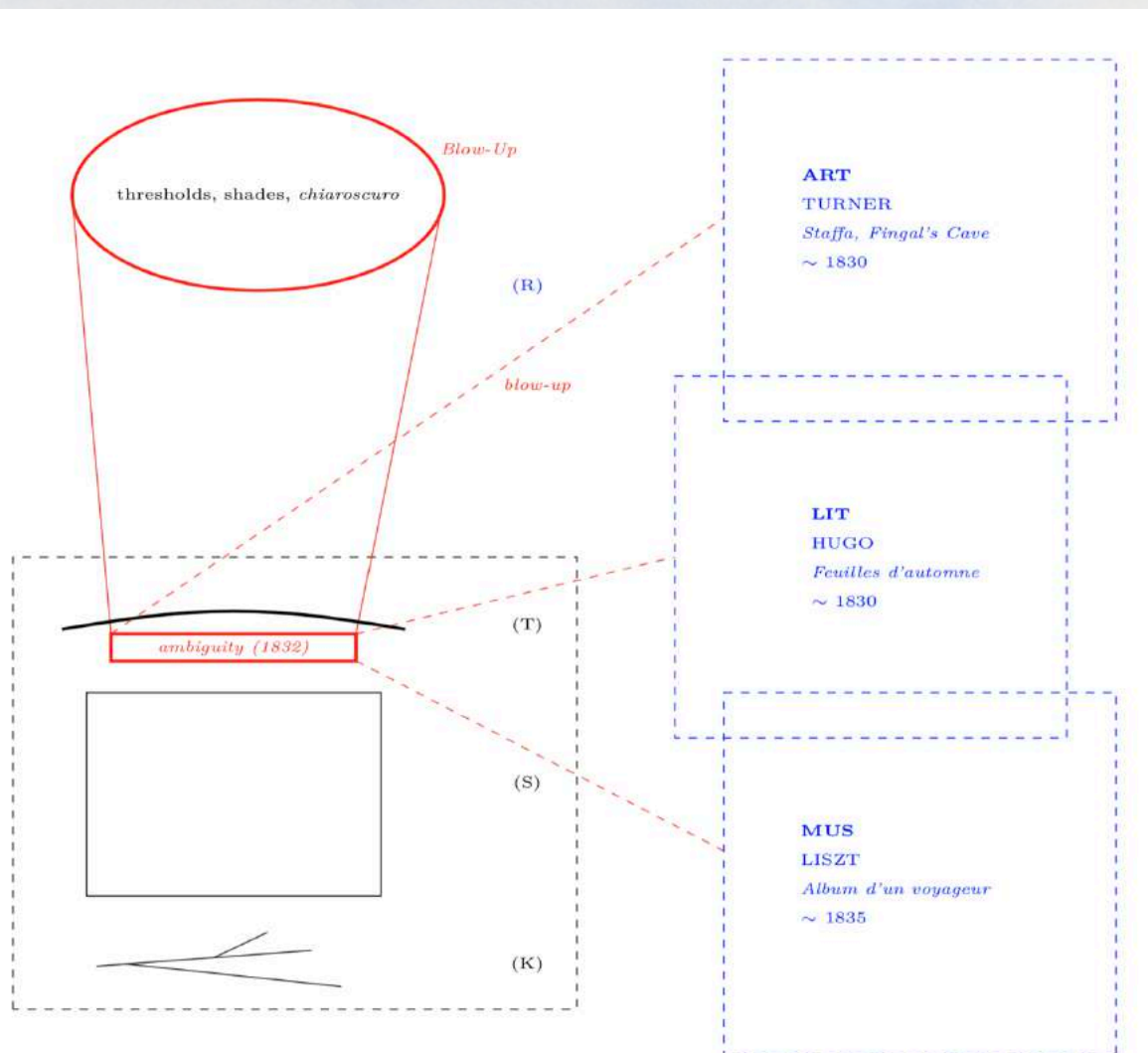
## 1.4. Theory: Blow-Up and blow-up in an (RTSK) model



Blow-Up (T) and blow-up (R) over a (TSK)

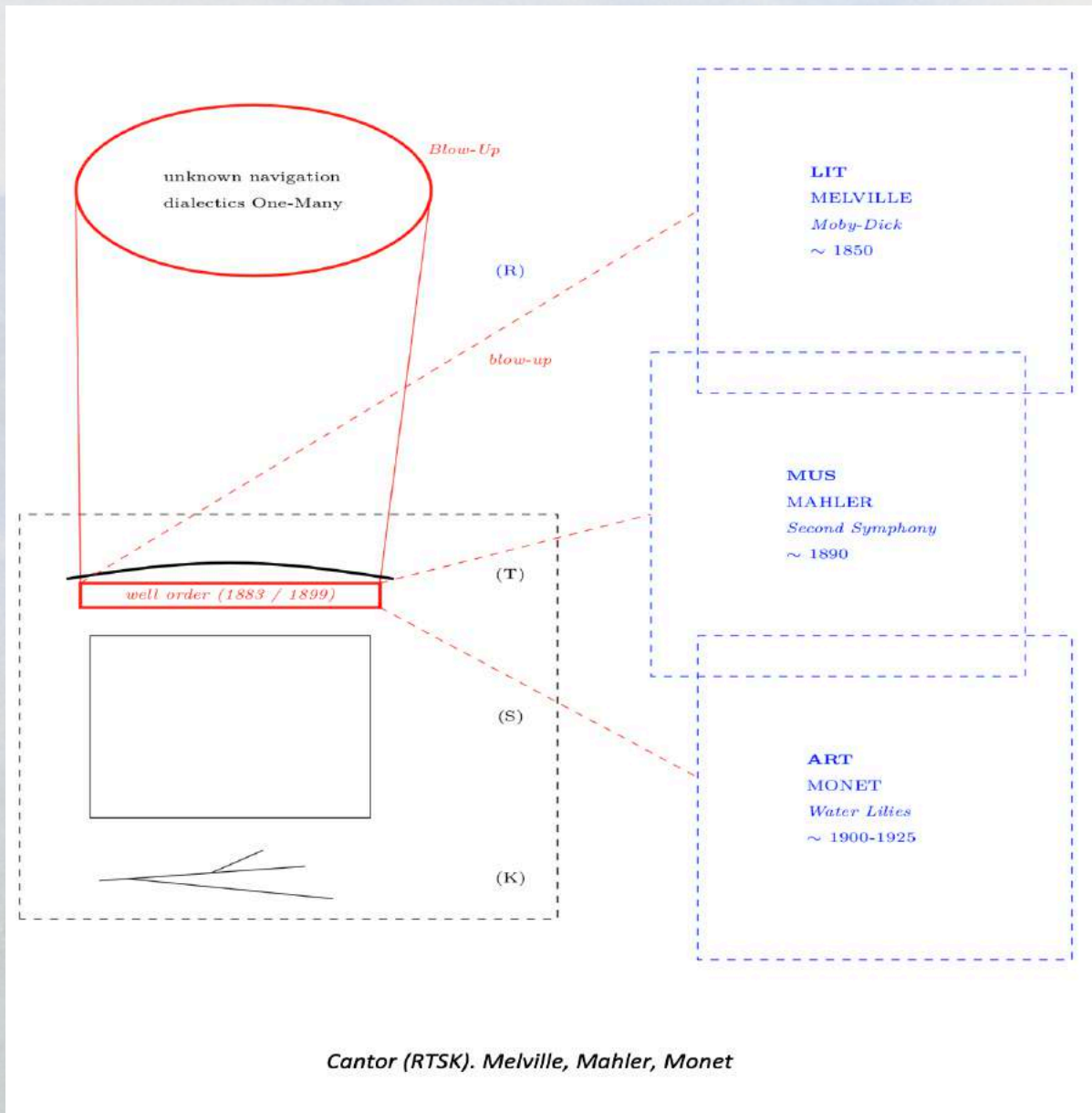


## 1.5 (a). Example 1: Galois (RTSK) – Turner, Hugo, Liszt



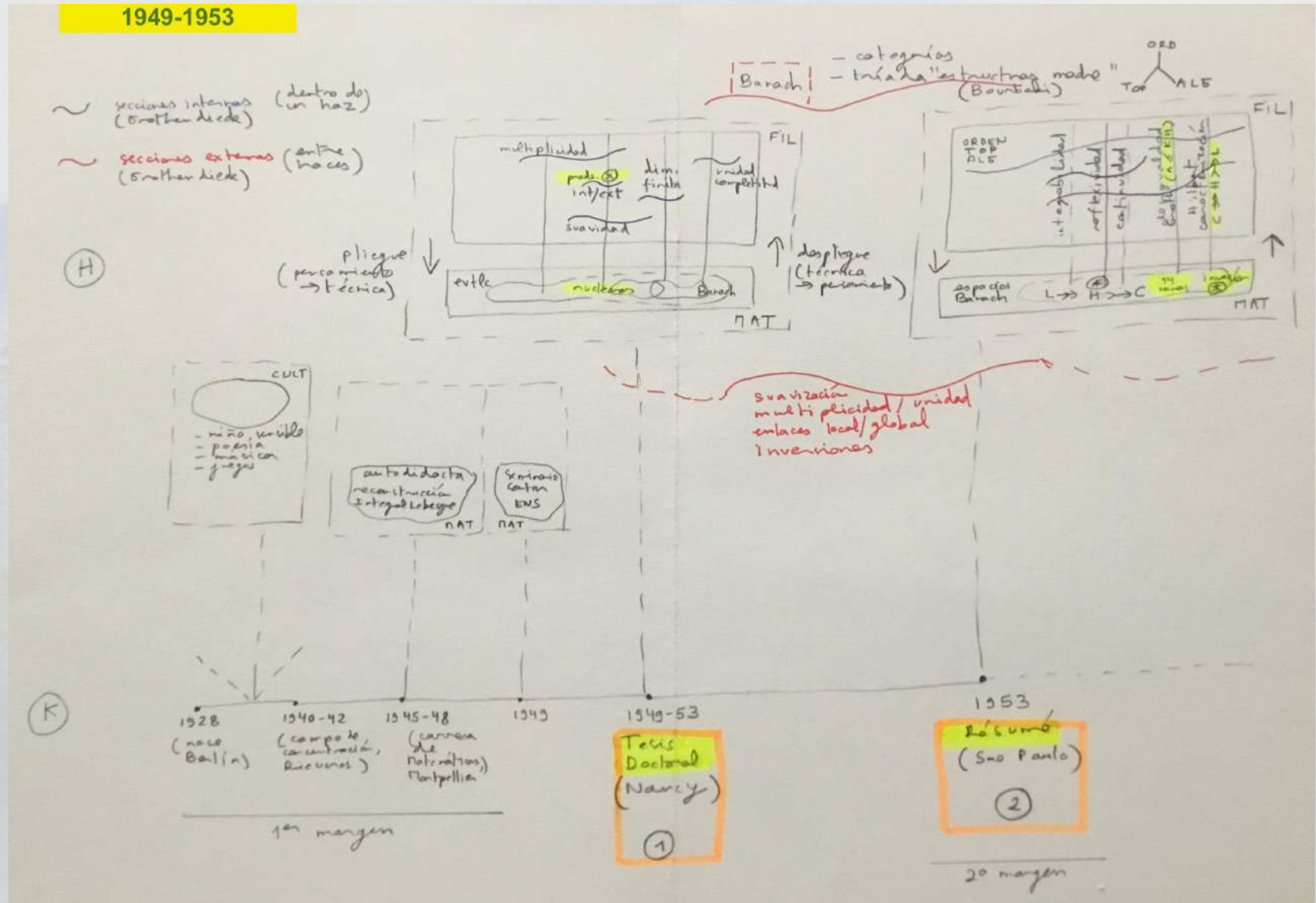
Galois (RTSK). Turner, Hugo, Liszt

## 1.5 (b). Example 2: Cantor (RTSK) – Melville, Mahler, Monet





## 2.1. 1949-1953: Functional Analysis



## 2.2. 1955-1957: Homological Algebra

1955-1957

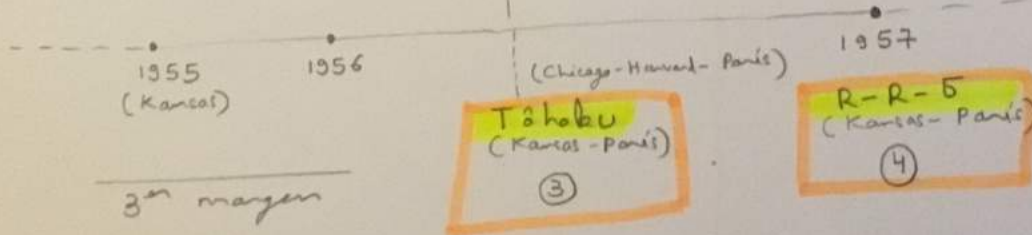
(H)



INVISIBLE < VISIBLE  
(Noby-Dick)

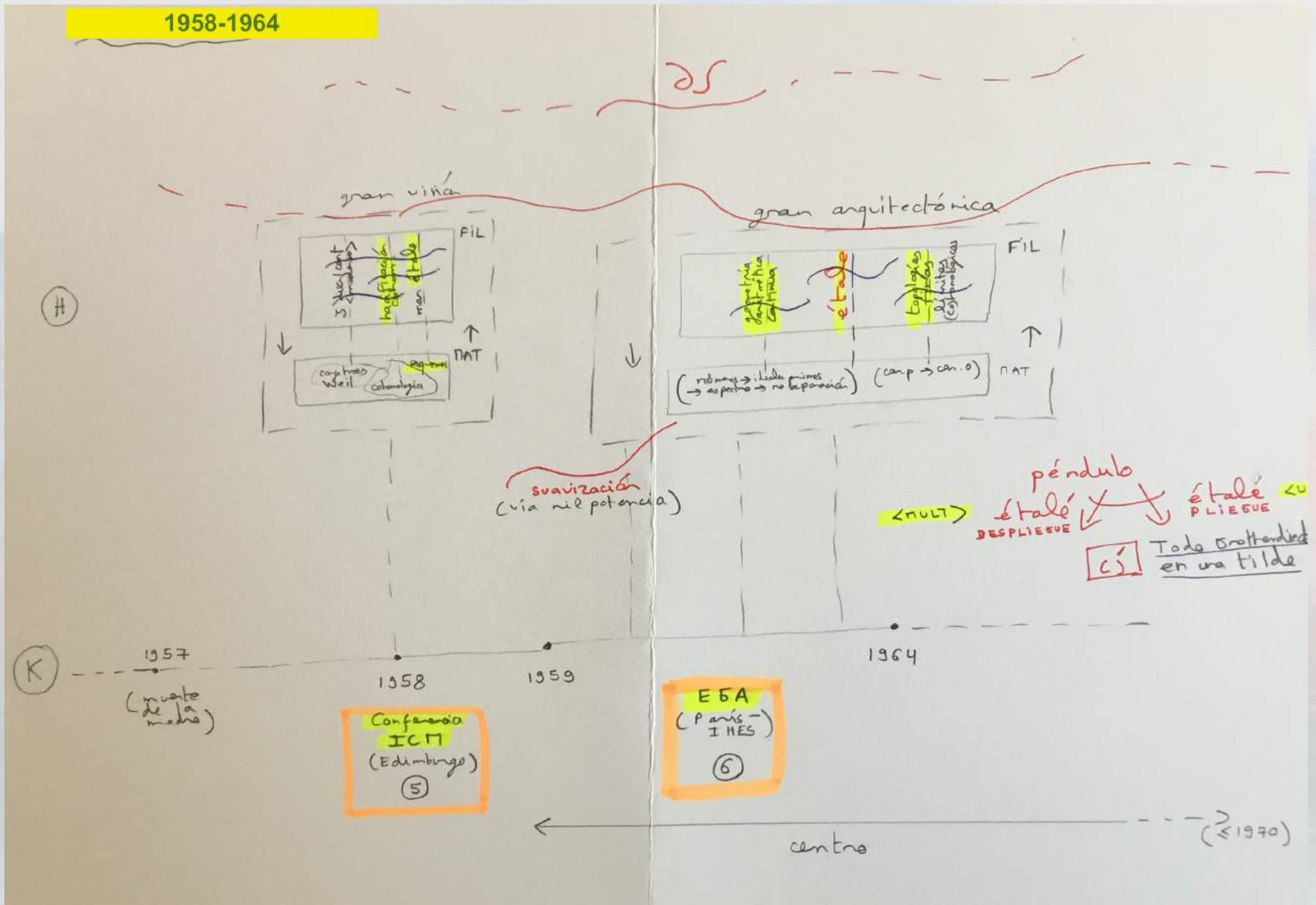
arquétipos < tipos  
unidad < múltiple  
↓ ↓  
proceso suavización vs. diferencia naturalización

(K)

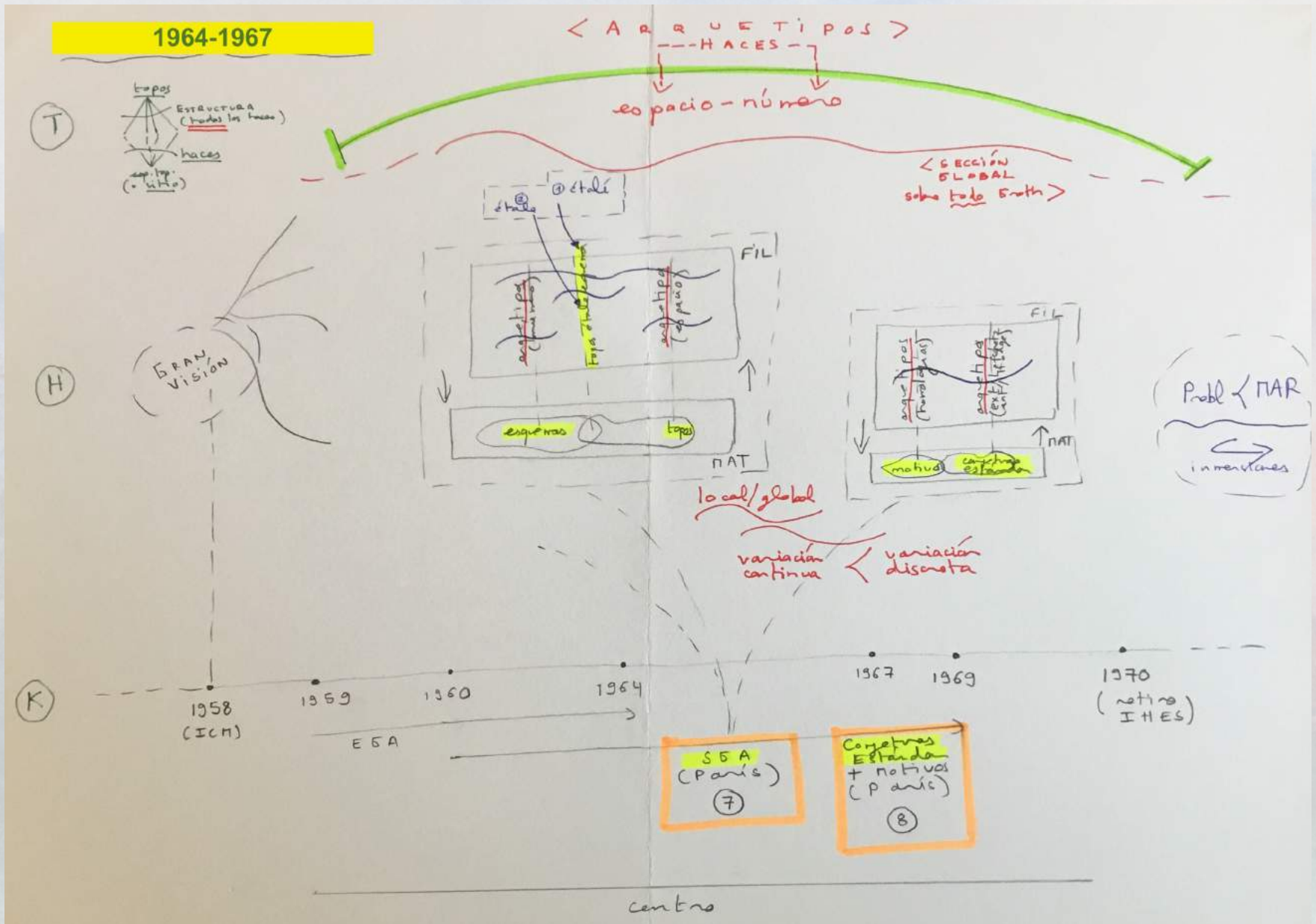




## 2.3. 1958-1964: Algebraic Geometry

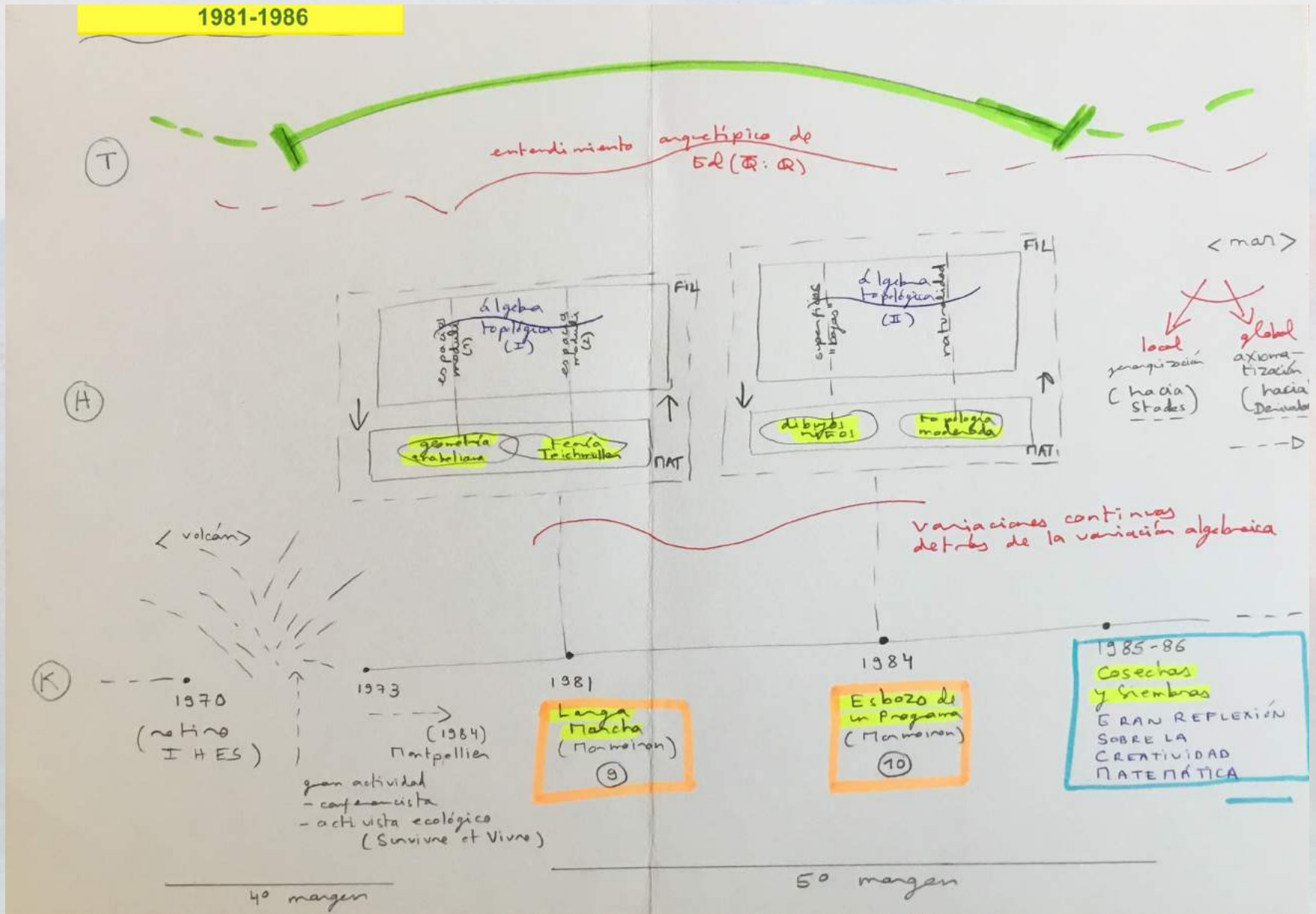


## 2.4. 1964-1967: Arithmetic Geometry

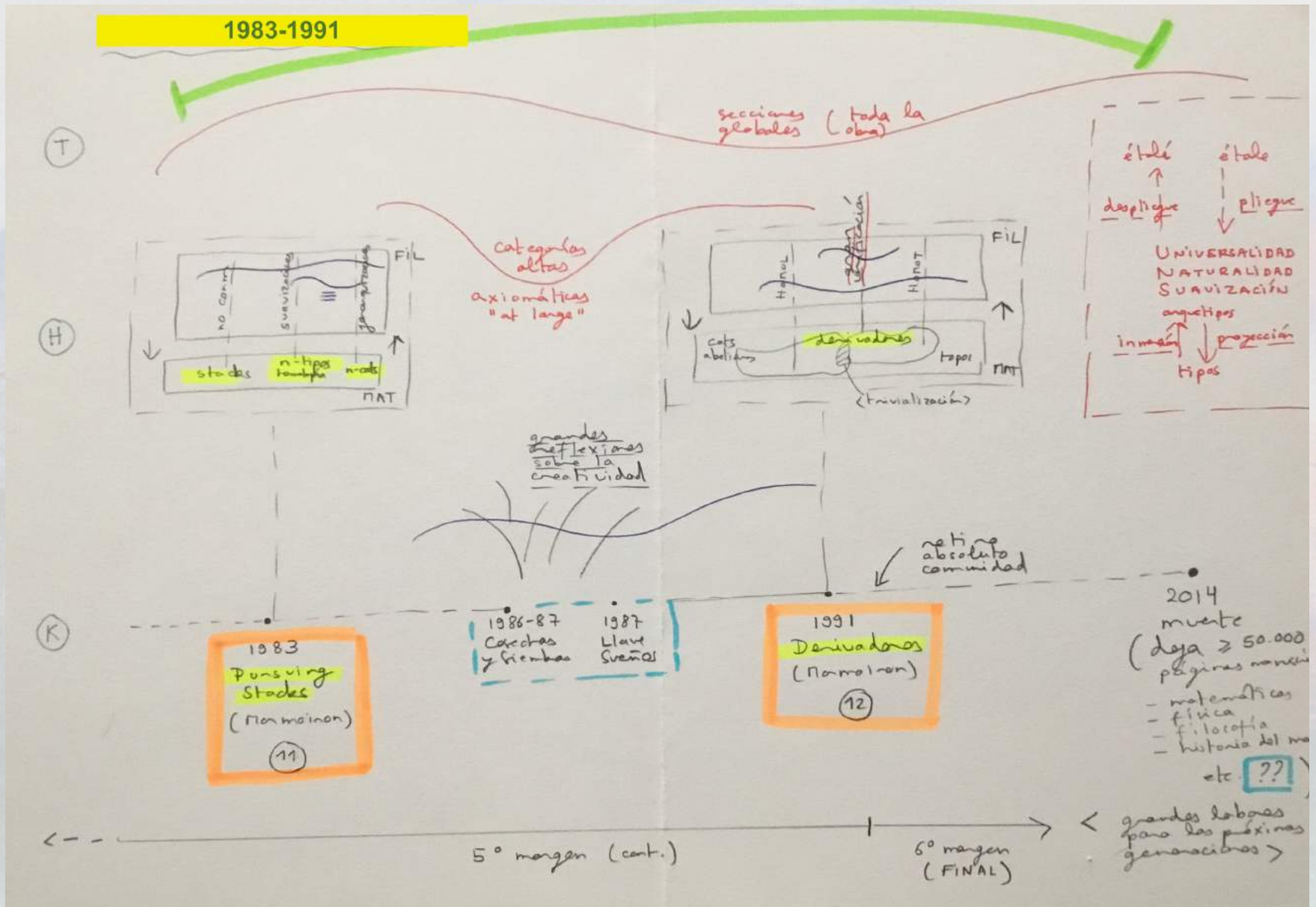




## 2.5. 1981-1986: Topological Algebra + Mathematical Philosophy



## 2.6. 1983-1991: Universal Algebra





## 2.7. Injections/Projections – Types/Archetypes – Types/Toposes – Singularities/Softness

