

EL DEPARTAMENTO DE MATEMÁTICAS TE  
INVITA A LA PLÁTICA SOBRE:

# MINIMAL CLONES GENERATED BY $\{0,1\}$ -VALUED MAJORITY OPERATIONS ON UP TO SIX- ELEMENT SETS.

## RESUMEN:

*Clones* are structures whose elements are named *operations* with the fundamental properties (1) that a *composition* of operations is defined and (2) that special operations named *projections* are contained.

Clones on a given carrier set  $A$  can be ordered by inclusion to form a complete lattice, where every non-bottom element lies above an atom (*minimal clone*), provided the carrier set is finite. Each minimal clone must be generated by a single function, and the possible types of minimum arity generators were described in the form of a necessary condition in a famous theorem by Ivo Rosenberg in the 1980s. Despite this fact, the lattice of clones is so complicated that even all minimal clones on  $A$  are understood only for  $|A| \leq 3$  by work of Béla Csákány (1980s) and Emil Post (1920-40s).

One of the types of generators of such minimal clones are *majority functions*, that is, functions satisfying

$$f(x, x, y) \approx f(x, y, x) \approx f(y, x, x) \approx x.$$

In recent years, the search for minimal  $\{0,1\}$ -valued majority clones has attracted attention, where, for a subset  $S$  of  $A$ , a majority function  $f$  is called *S-valued* if  $f(x,y,z)$  belongs to  $S$  whenever  $x,y,z$  belonging to  $A$  are pairwise distinct. An  $n$ -ary function  $f$  with  $n \geq 2$ , is said to be *cyclically symmetric* if

$$f(x_1, \dots, x_n) \approx f(x_2, \dots, x_n, x_1).$$

In ongoing work we have determined for set  $A$  containing  $\{0,1\}$  with  $4 \leq |A| \leq 6$  all cyclically symmetric  $\{0,1\}$ -valued majority operations on  $A$  that generate a minimal clone. We have counted and categorised these generating functions up to a natural equivalence notion. Moreover, we have been able to classify the resulting minimal clones up to the abstract composition structure of their ternary parts (unitary 3-place Menger algebras). The surprising result is that, so far (for  $|A| \leq 6$ ), the isomorphism class of the associated 3-place Menger algebra of a minimal clone generated by a cyclically symmetric  $\{0,1\}$ -valued majority function is already determined by its cardinality. The talk will report on how these new results were obtained (jointly with Edith Vargas-García and Andreas Wachtel, ITAM) and, if time permits, will give an outlook towards future steps.

## Detalles del evento:

 **Fecha:** Viernes, 20 de Febrero del 2026

 **Hora:** 13:00 (Hora del Centro de México)

 **Ubicación:** Salón B2

Presentado por



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## CONECTATE VÍA ZOOM:



Escanea para ingresar a la página del  
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