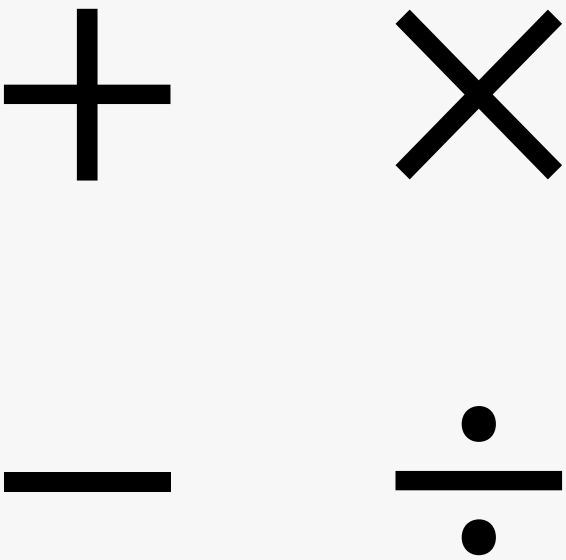


FIXED POINTS: ALL THE CYCLE WITH PERIOD 1

CYCLE: LOOP OF REPEATING STATES

TRANSIENT STATE: NOT VISITED INFINITELY MANY TIMES

RECURRENT STATE: VISITED INFINITELY MANY TIMES

CONNECTED COMPONENTS: SUBSET OF THE GRAPH

CONSERVED QUANTITY: A FUNCTION THAT LEADS TO 1 OR MORE SPECIFIC STATE

TRIVIAL CONSERVED QUANTITY: A FUNCTION THAT LEADS TO THE SAME VALUE FOR ALL CONNECTED COMPONENTS

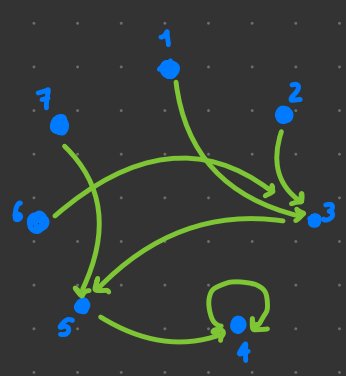
- TRANSIENT STATE + RECURRENT STATE = ALL STATES
- IF IT "GOES OUT" OF THE STATES IT IS NOT A DYNAMICAL SYSTEM
- ALL THE STATES MUST BE IN ONE CONNECTED COMPONENT. IF TWO STATES TOUCHES EACHOTHER THEY BECONGS TO THE SAME CONNECTED COMPONENT
- THERE IS ALWAYS AT LEAST A CONNECTED COMPONENT (CAN BE THE TOAL GRAPH)

$8327 \bmod 36 = \frac{8327}{36} = 231.305$

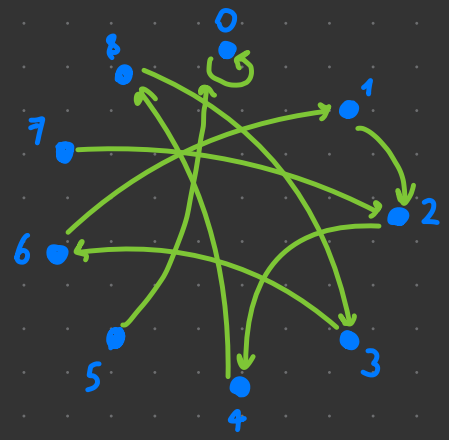
↳ TOLGO INTERO

$231.305 - 231 = 0.305$

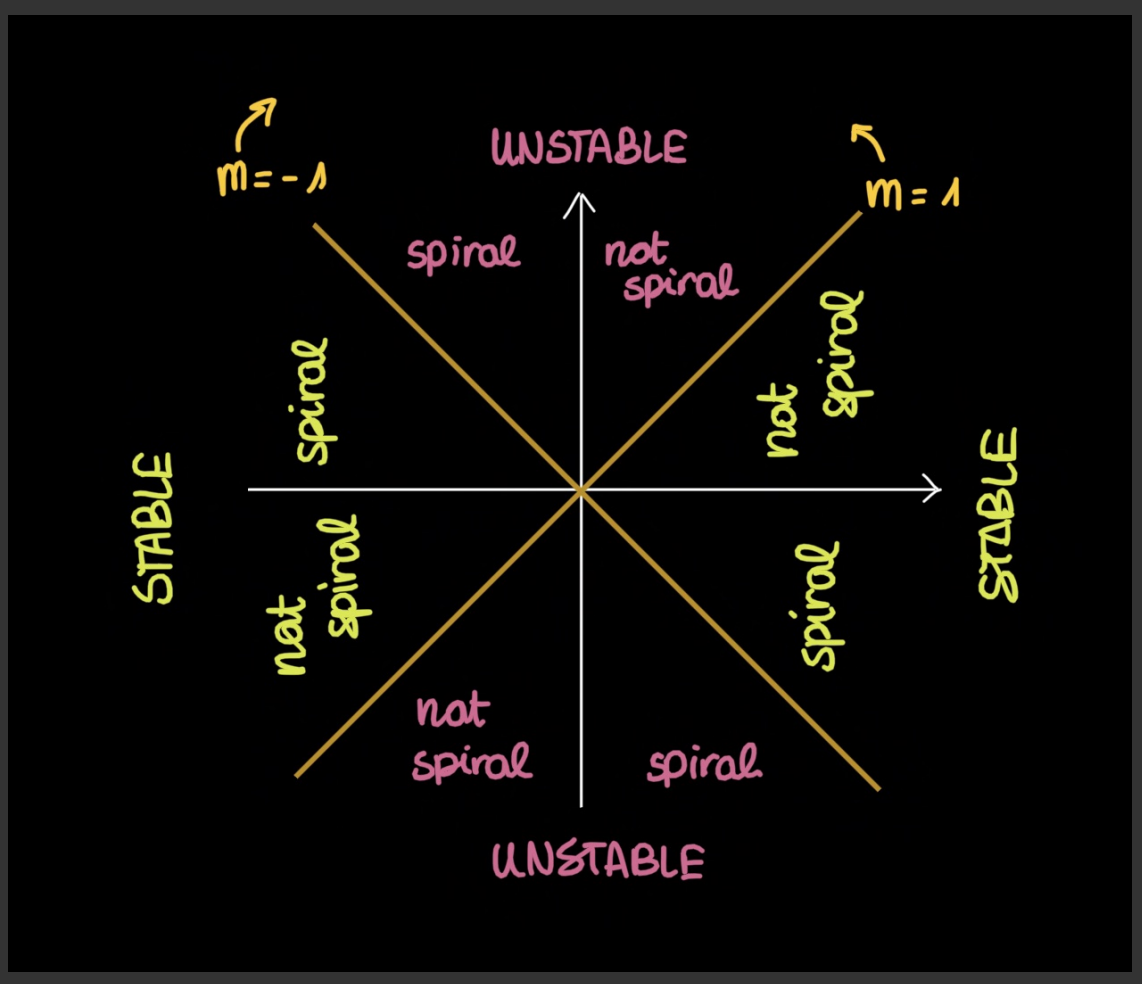
$0.305 \cdot 36 =$ RISULTATO



FIXED POINTS: STATE 4
CYCLE: THE ONE WITH ONLY 4
TRANSIENT STATE: 1, 2, 3, 5, 6, 7
RECURRENT STATE: STATE 4
CONNECTED COMPONENTS: THE GRAPH ITSELF



FIXED POINTS: $\{0\}$
CYCLES: $\{0\}$ $\{8, 3, 6, 1, 2, 4, 8\}$
TRANSIENT STATE: $\{5, 7\}$
RECURRENT STATE: $\{1, 2, 3, 4, 6, 8\}$
CONNECTED COMPONENTS: $\{5, 0\}$ $\{7, 2, 4, 8, 3, 6, 1, 2\}$



KINETIC

POTENTIAL

$L = T - V$

$\frac{1}{2} m v^2 = \frac{1}{2} m \dot{x}^2$

PATH OF THE BALL: THE ONE THAT MINIMIZE THE ACTION (INTEGRAL OF L)

$$\frac{\partial L}{\partial q} - \frac{d}{dt} \frac{dL}{d\dot{q}} = 0$$