A model for fish stock management

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Schaefer's deterministic model

X_n → Actual biomass

r → Growing rate

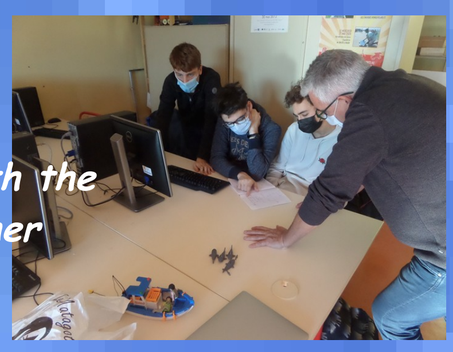
M → Maximal biomass

C → Fishing

$$X_{n+1} = X_n + rX_n\left(1 - \frac{X_n}{M}\right) - C$$

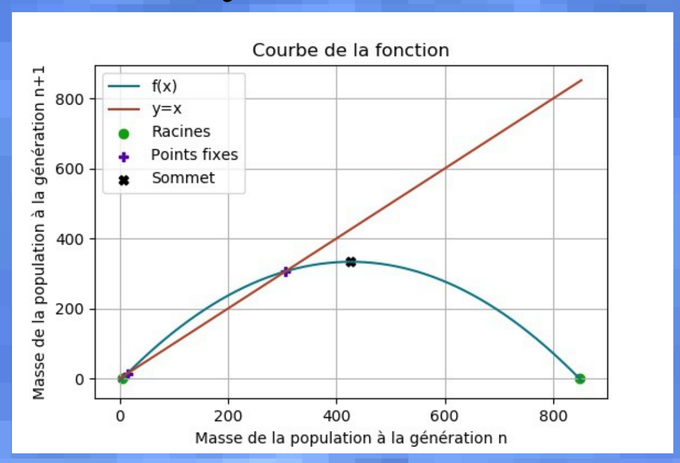
$$X_{n+1} = f(X_n) \qquad f(X) = X + rX\left(1 - \frac{X}{M}\right) - C$$

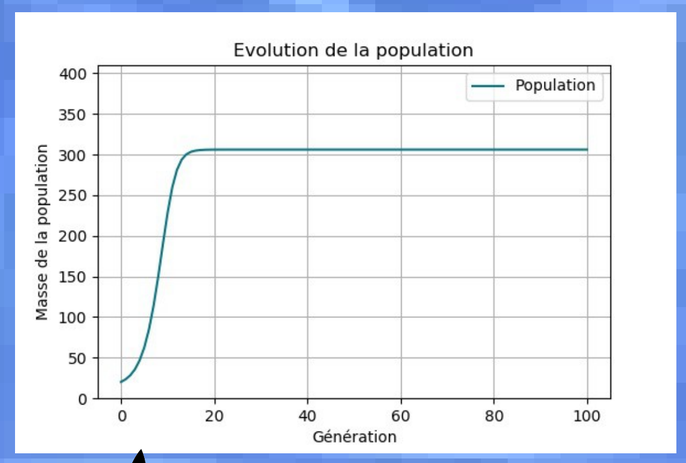
Exchanges via video conferences



Meeting with the researcher

X_0 → 20 r → 0,6 M → 320 C → 8





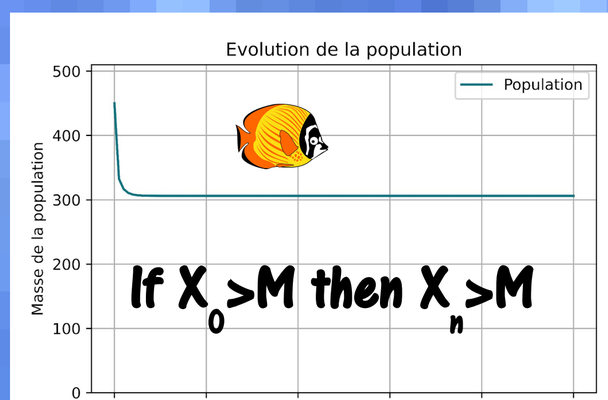
We note *a* and *b* the solutions, if they exist of $f(x)=x$

Let x_1 and x_2 be the solutions of $f(x)=0$

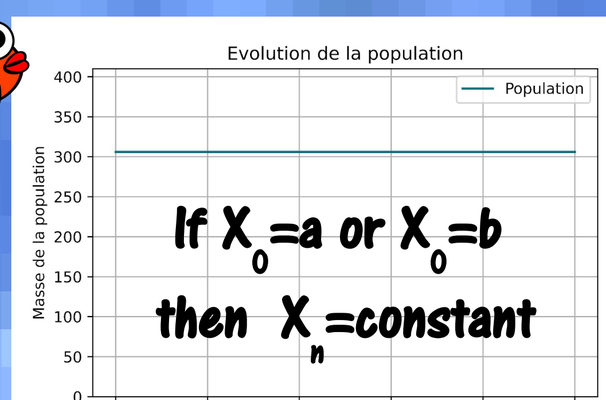
s the abscissa of the vertex of the parabola

Some special cases

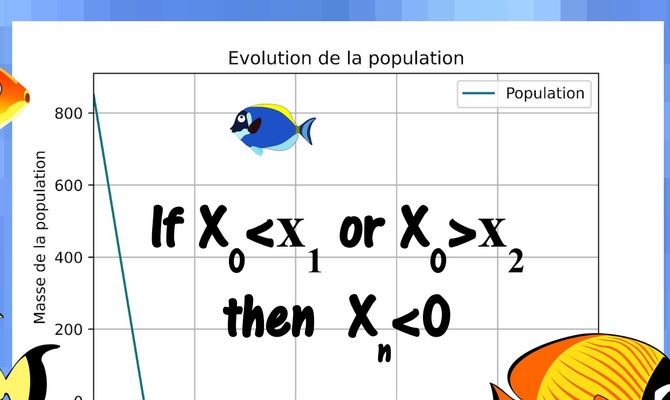
Filming of an explanatory video



If $X_0 > M$ then $X_n > M$



If $X_0 = a$ or $X_0 = b$ then X_n = constant



If $X_0 < x_1$ or $X_0 > x_2$ then $X_n < 0$

If $a < X_0 < b$ then $\lim X_n = b$

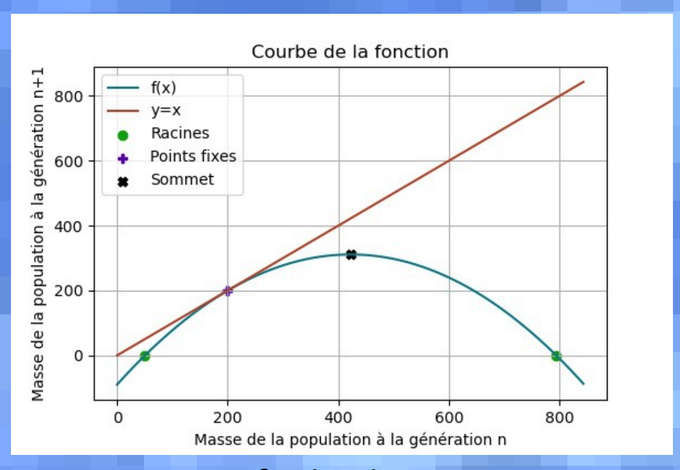
If $X_0 < a$ then $X_n < 0$

Lecture at the congress

If double root C=(Mr)/4

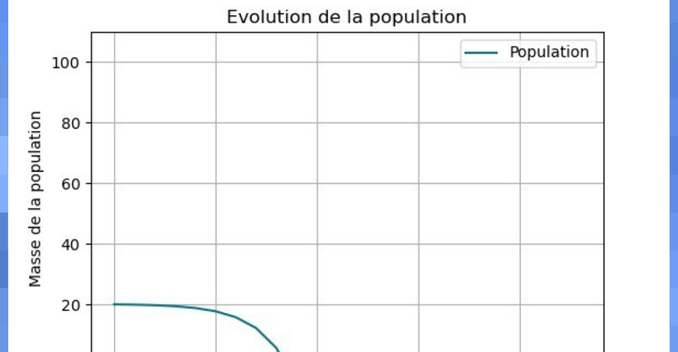
As C increases, [a;b] decreases.

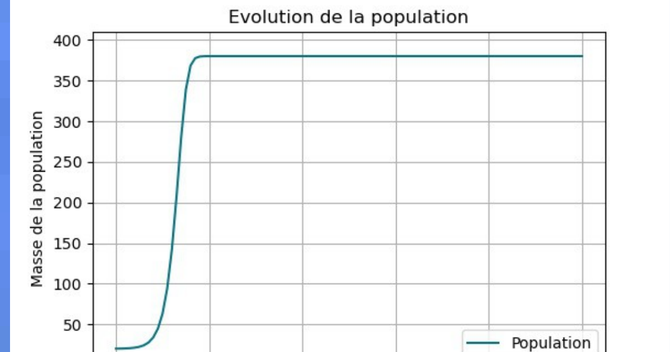
When C is maximum, a=b



C=17,1

Exchanges with researchers during the congress





Projet ERASMUS MaSuD 2021-2022 1/1

Funded by the European Union