Rapport du projet

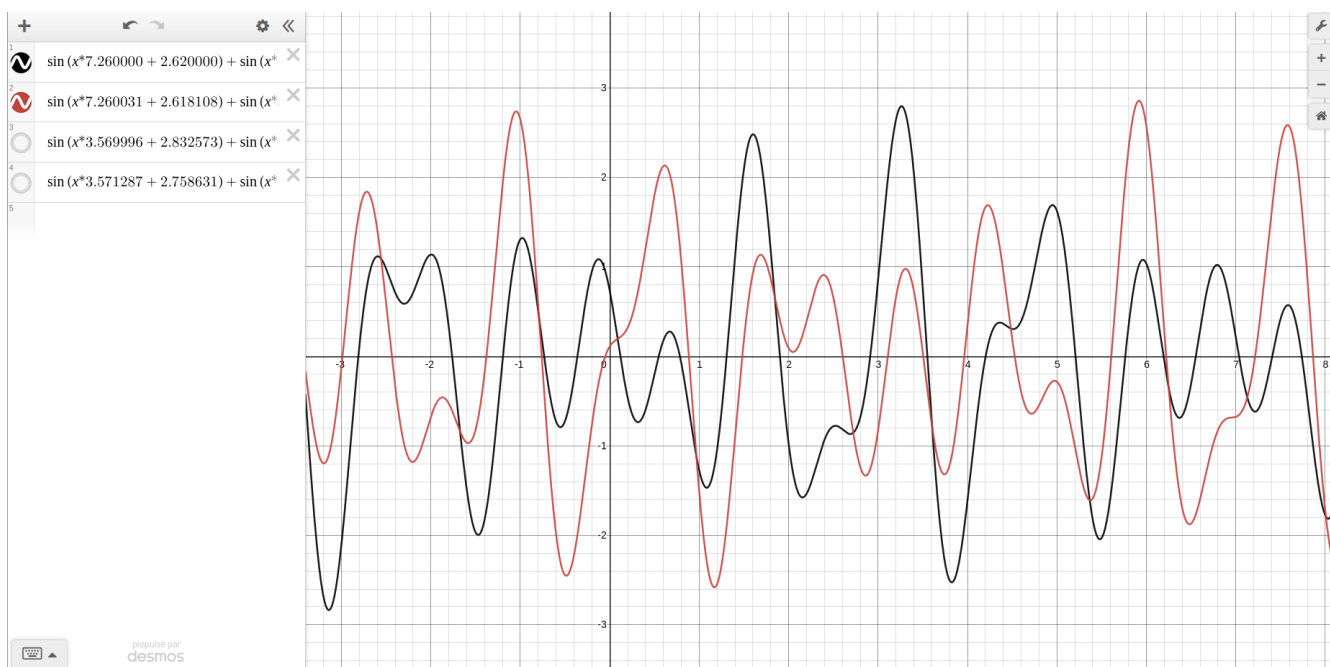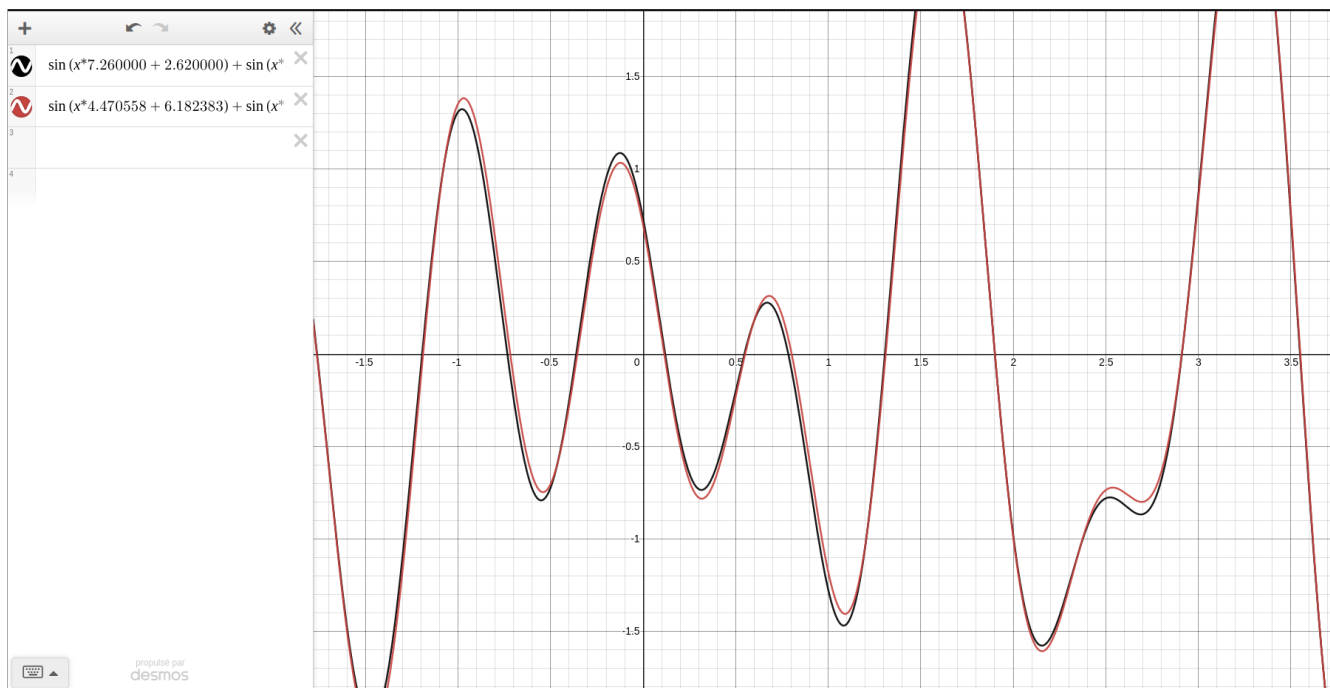## Table of Contents

introduction

> L'objectif est de voir si l'évolution pourra prescrire des probabilités de croisement quasi nulles à l'intérieur d'un même sinus ou pas. Si c'est le cas, cela montrera que nous aurons un croisement auto-adaptatif "intelligent" capable, de lui-même, de déterminer l'épistasie (la corrélation) entre certains gènes.

présentation du problème

- **L'influence (ou non) de points de croisement tombant au milieu d'un sinus ou entre deux sinus**

- **La comparaison entre les runs précédents et des runs où les valeurs x0..x7 évoluent en même temps que le génome (par mutation et croisement)**

Resultat

plot points de croisement tombant au milieu d'un sinus

$\sin (x*7.260000 + 2.620000) + \sin (x*$
$\sin (x*4.470558 + 6.182383) + \sin (x*$

$\sin (x*7.260000 + 2.620000) + \sin (x*$
$\sin (x*7.260031 + 2.618108) + \sin (x*$
$\sin (x*3.569996 + 2.832573) + \sin (x*$
$\sin (x*3.571287 + 2.758631) + \sin (x*$

Run configuration: Start time: 2022-01-16_13-48-36 Seed: 1642337316 Number of generations: 100 Population size: 10000 CPU Threads number: 1 Evaluation goal: 1

Special options: Offspring population size: 10000 Mutation probability: 1 Crossover probability: 1 Selection operator: Tournament Selection pressure: 7 Reduce parent pressure: 2 Reduce offspring pressure: 1 Reduce parents operator: Tournament Reduce offspring operator: Tournament Surviving parents: 10000 Surviving offspring: 10000 Replacement operator: Tournament Replacement pressure: 2 Elitism: 1 Elite size: 1

Remote island model: Remote island model: 0 Ip file: ip.txt Migration probability: 0.3 Server port: 2929 Reevaluate immigrants: 0

Result: Best fitness: 1174.31 Best individual: 0.186136 0.895364 0.547576 0.486443 0.502174 0.461888 0.041086 0.260013 0 69.3394 4.469 -0.02156 26.4163 3.56856 2.90244 29.1595 7.25982 2.62854 1174.31

Elapsed time: 43.9885 s

User's messages:

Run configuration: Start time: 2022-01-16_13-52-40 Seed: 1642337560 Number of generations: 100 Population size: 10000 CPU Threads number: 1 Evaluation goal: 1

Special options: Offspring population size: 10000 Mutation probability: 1 Crossover probability: 1 Selection operator: Tournament Selection pressure: 7 Reduce parent pressure: 2 Reduce offspring pressure: 1 Reduce parents operator: Tournament Reduce offspring operator: Tournament Surviving parents: 10000 Surviving offspring: 10000 Replacement operator: Tournament Replacement pressure: 2 Elitism: 1 Elite size: 1

Remote island model: Remote island model: 0 Ip file: ip.txt Migration probability: 0.3 Server port: 2929 Reevaluate immigrants: 0

Result: Best fitness: 1218.74 Best individual: 0.613273 0.438312 0.0644815 0.298875 0.307368 0.671874 0.0986998 0.251067 0 28.9208 7.26215 2.52939 69.2926 4.46976 6.22464 26.4062 3.56827 2.92448 1218.74
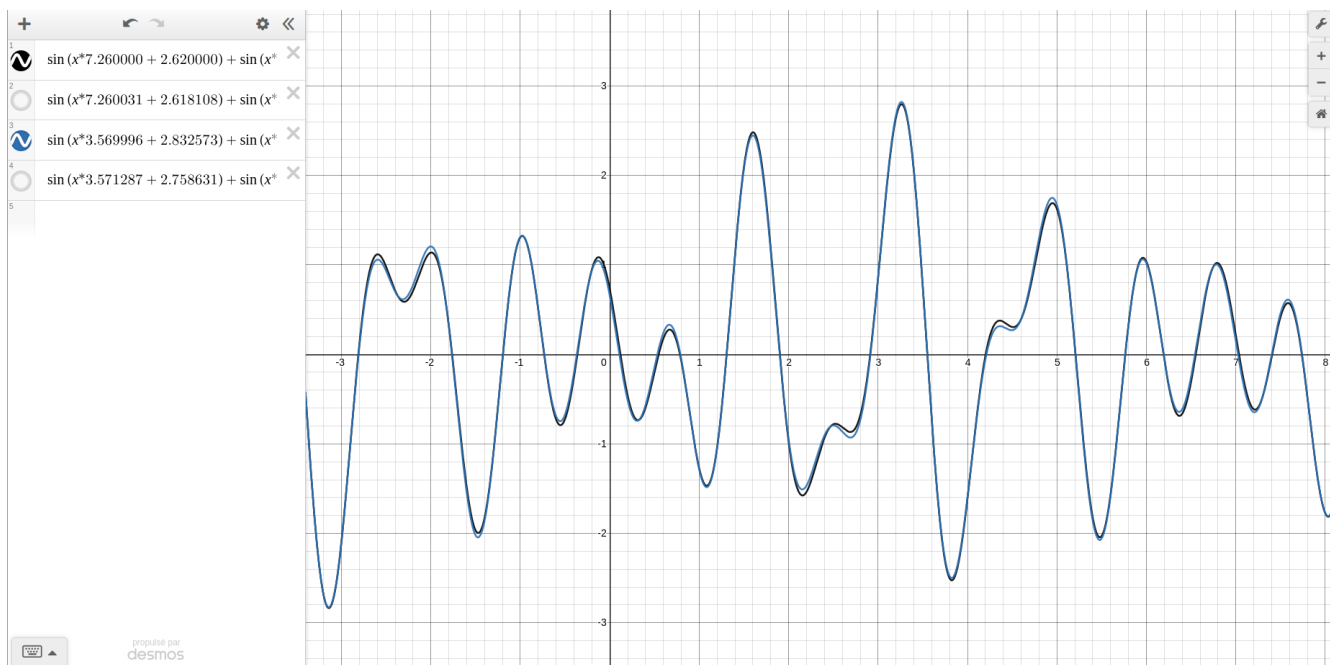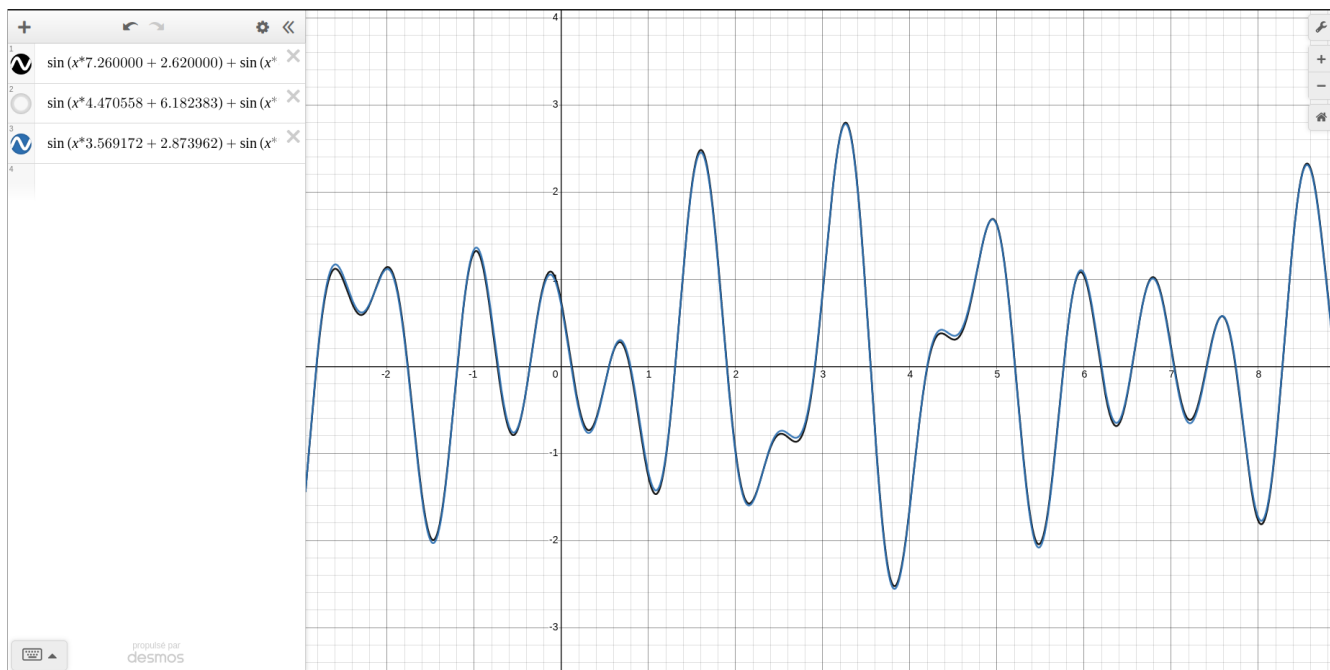
Elapsed time: 43.5905 s

User's messages:

les probs qu'on change les valeurs de sinus sont:

0.186136 0.895364 0.547576 0.486443 0.502174 0.461888 0.041086 0.260013

0.613273 0.438312 0.0644815 0.298875 0.307368 0.671874 0.0986998 0.251067

plot points de croisement entre deux sinus

sin (x*7.260000 + 2.620000) + sin (x*
sin (x*4.470558 + 6.182383) + sin (x*
sin (x*3.569172 + 2.873962) + sin (x*

sin (x*7.260000 + 2.620000) + sin (x*
sin (x*7.260031 + 2.618108) + sin (x*
sin (x*3.569996 + 2.832573) + sin (x*
sin (x*3.571287 + 2.758631) + sin (x*

Run configuration: Start time: 2022-01-16_13-53-42 Seed: 1642337622 Number of generations: 100 Population size: 10000 CPU Threads number: 1 Evaluation goal: 1

Special options: Offspring population size: 10000 Mutation probability: 1 Crossover probability: 1 Selection operator: Tournament Selection pressure: 7 Reduce parent pressure: 2 Reduce offspring pressure: 1 Reduce parents operator: Tournament Reduce offspring operator: Tournament Surviving parents: 10000 Surviving offspring: 10000 Replacement operator: Tournament Replacement pressure: 2 Elitism: 1 Elite size: 1

Remote island model: Remote island model: 0 Ip file: ip.txt Migration probability: 0.3 Server port: 2929 Reevaluate immigrants: 0

Result: Best fitness: 1079.65 Best individual: 0.472113 0.769438 0.961811 0.711971 0.220519 0.231622 0.317335 0.807162 0 69.2559 4.46926 -0.0347972 29.2962 7.25823 2.70685 26.3723 3.5708 2.78951 1079.65

Elapsed time: 42.8251 s

User's messages:

Run configuration: Start time: 2022-01-16_13-51-00 Seed: 1642337460 Number of generations: 100 Population size: 10000 CPU Threads number: 1 Evaluation goal: 1

Special options: Offspring population size: 10000 Mutation probability: 1 Crossover probability: 1 Selection operator: Tournament Selection pressure: 7 Reduce parent pressure: 2 Reduce offspring pressure: 1 Reduce parents operator: Tournament Reduce offspring operator: Tournament Surviving parents: 10000 Surviving offspring: 10000 Replacement operator: Tournament Replacement pressure: 2 Elitism: 1 Elite size: 1

Remote island model: Remote island model: 0 Ip file: ip.txt Migration probability: 0.3 Server port: 2929 Reevaluate immigrants: 0

Result: Best fitness: 1269.19 Best individual: 0.0502886 0.968821 0.74906 0.917252 0.875796 0.0501997 0.957647 0.36432 0 29.1917 7.25996 2.62169 26.3213 3.56823 2.93067 69.3316 4.47106 6.15684 1269.19
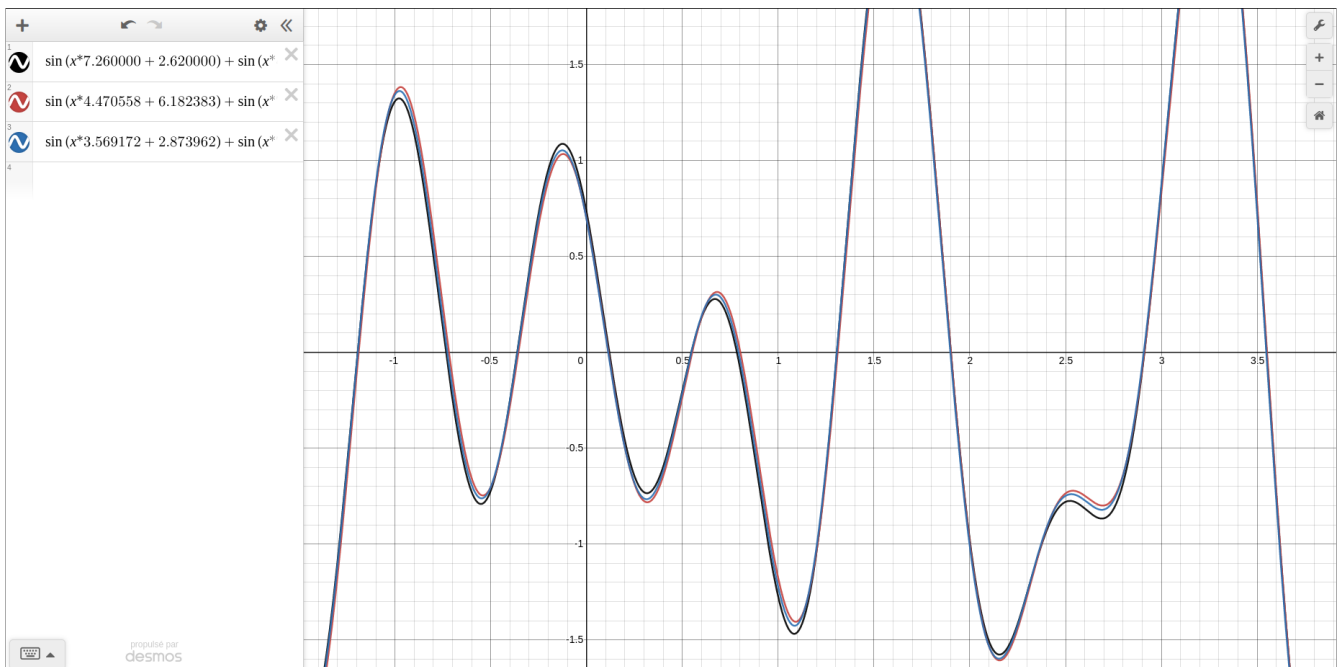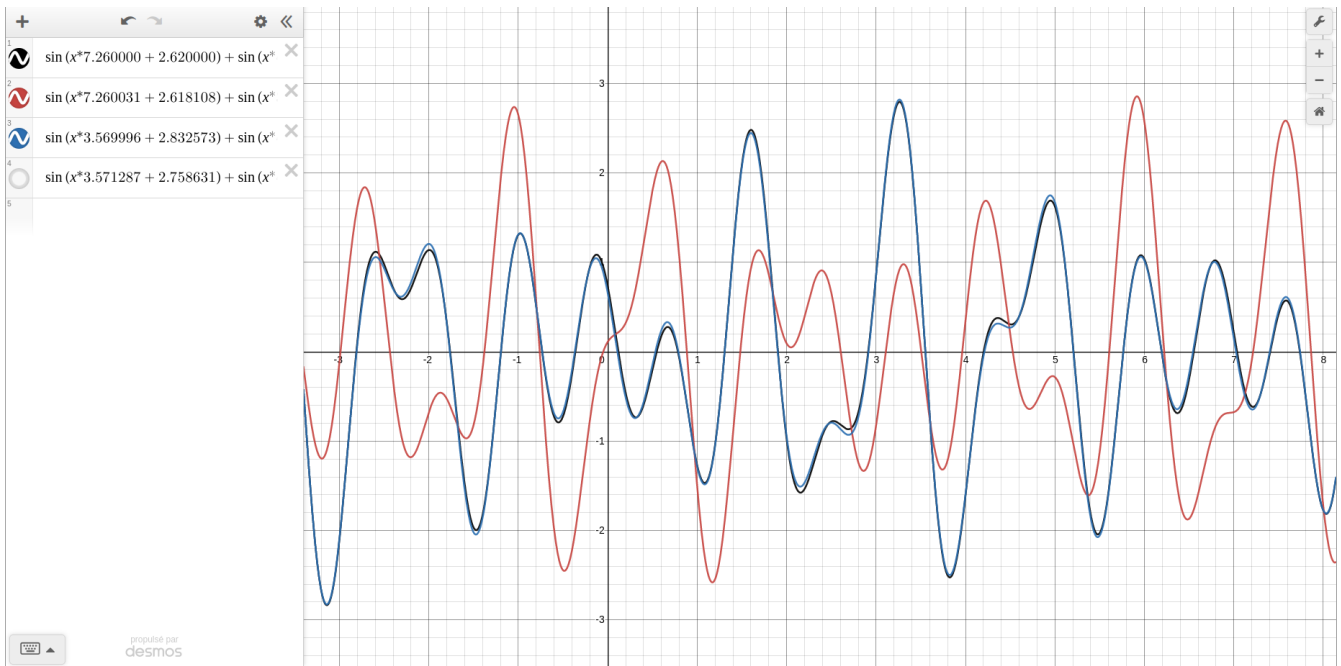
Elapsed time: 43.8001 s

User's messages:

les probs qu'on change les valeurs de sinus sont:

0.0502886 0.968821 0.74906 0.917252 0.875796 0.0501997 0.957647 0.36432

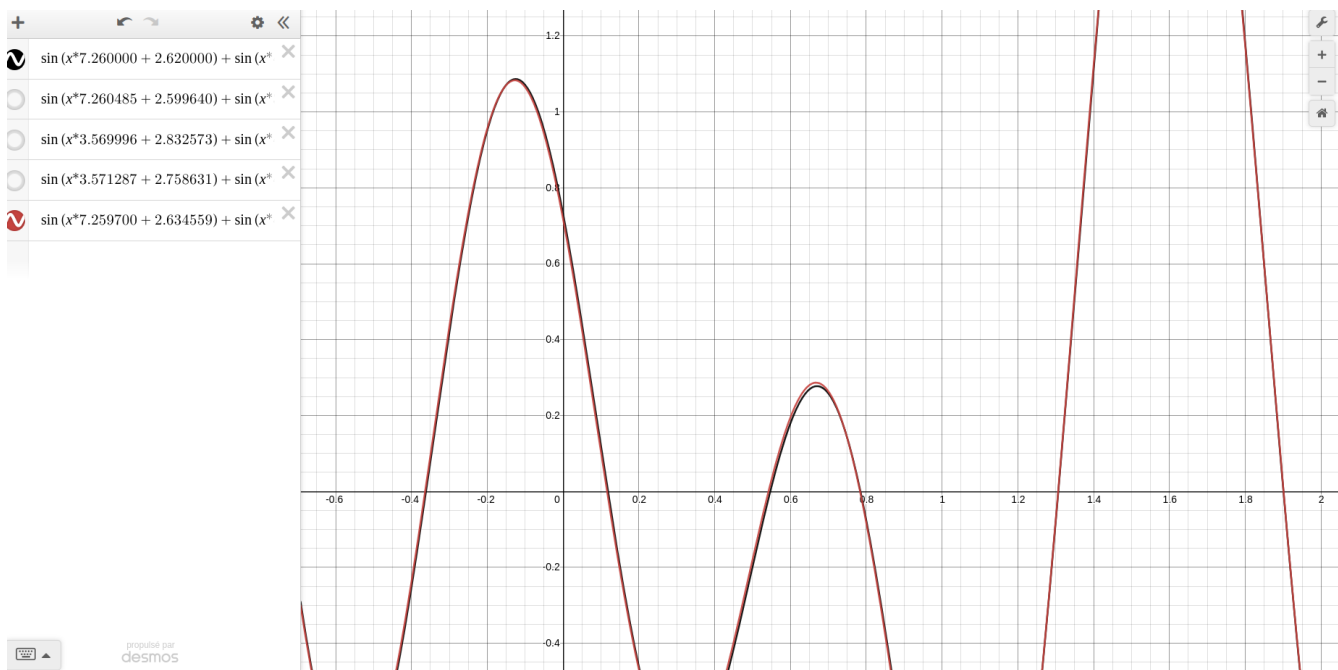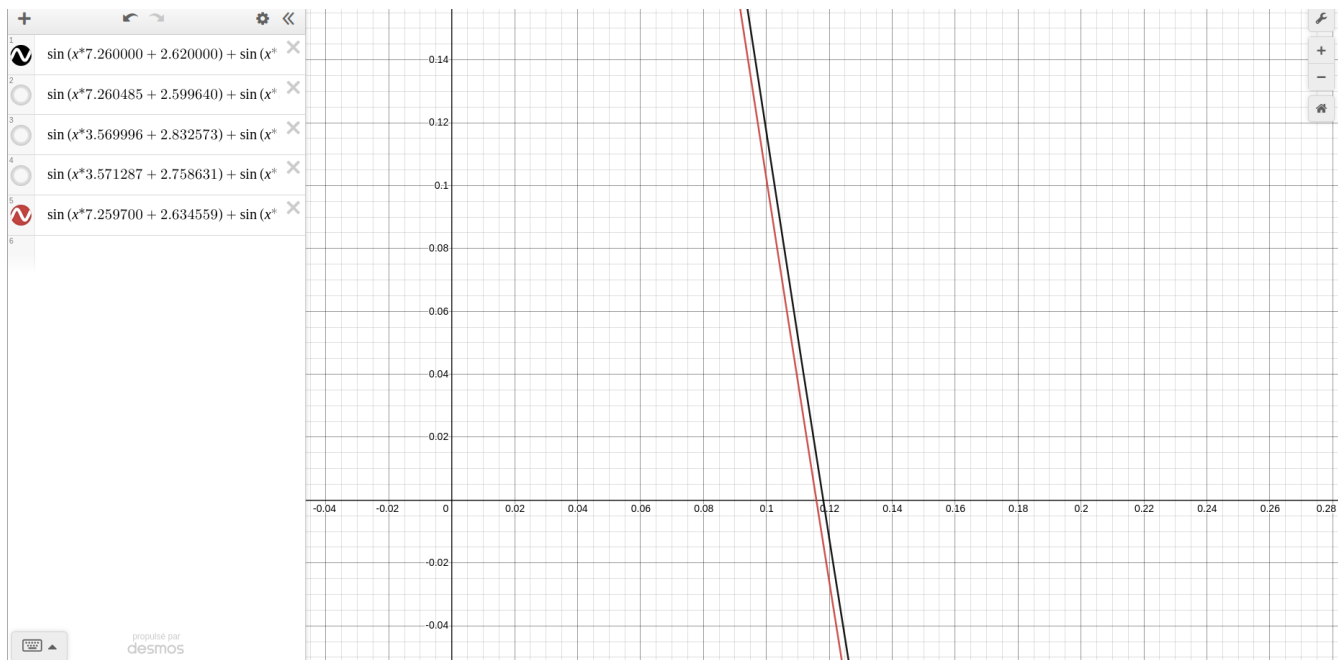**0.472113 0.769438 0.961811 0.711971 0.220519 0.231622 0.317335 0.807162**

voir différence

rouge est moins bon mais pas trop ! pas consitant! On peut conclure qu'il n'y pas pas d'influence …

question b

si les probas sont proche de 0, cela montrera que nous aurons un croisement auto-adaptatif "intelligent" capable, de lui-même,

plots

100 gen

Run configuration: Start time: 2022-01-16_14-13-46 Seed: 1642338826 Number of generations: 100 Population size: 10000 CPU Threads number: 1 Evaluation goal: 1

Special options: Offspring population size: 10000 Mutation probability: 1 Crossover probability: 1 Selection operator: Tournament Selection pressure: 7 Reduce parent pressure: 2 Reduce offspring pressure: 1 Reduce parents operator: Tournament Reduce offspring operator: Tournament Surviving parents: 10000 Surviving offspring: 10000 Replacement operator: Tournament Replacement pressure: 2 Elitism: 1 Elite size: 1

Remote island model: Remote island model: 0 Ip file: ip.txt Migration probability: 0.3 Server port: 2929 Reevaluate immigrants: 0

Result: Best fitness: 1529.74 Best individual: 0.00105064 0.00246802 0.00440913 0.00545545 0.00129316 0.00762925 0.00665536 0.00225968 -29.0708 7.2624 5.64082 26.4123 3.57329 2.66354 69.5781 4.47012 6.20415 1529.74

Elapsed time: 44.5812 s

User's messages:

1000 gen

Run configuration: Start time: 2022-01-16_14-04-15 Seed: 1642338255 Number of generations: 1000 Population size: 10000 CPU Threads number: 1 Evaluation goal: 1

Special options: Offspring population size: 10000 Mutation probability: 1 Crossover probability: 1 Selection operator: Tournament Selection pressure: 7 Reduce parent pressure: 2 Reduce offspring pressure: 1 Reduce parents operator: Tournament Reduce offspring operator: Tournament Surviving parents: 10000 Surviving offspring: 10000 Replacement operator: Tournament Replacement pressure: 2 Elitism: 1 Elite size: 1

Remote island model: Remote island model: 0 Ip file: ip.txt Migration probability: 0.3 Server port: 2929 Reevaluate immigrants: 0

Result: Best fitness: 98.0263 Best individual: 0.00189468 0.000888565 0.000649089 0.00695411 0.00438976 0.000108344 0.00565931 0.00773423 29.1041 7.25991 2.62408 69.3977 4.47008 -0.0770609 26.3975 3.57003 2.82847 98.0263

Elapsed time: 431.378 s

User's messages:

10000 gen

Run configuration: Start time: 2022-01-16_14-16-13 Seed: 1642338973 Number of generations: 10000 Population size: 10000 CPU Threads number: 1 Evaluation goal: 1

Special options: Offspring population size: 10000 Mutation probability: 1 Crossover probability: 1 Selection operator: Tournament Selection pressure: 7 Reduce parent pressure: 2 Reduce offspring pressure: 1 Reduce parents operator: Tournament Reduce offspring operator: Tournament Surviving parents: 10000 Surviving offspring: 10000 Replacement operator: Tournament Replacement pressure: 2 Elitism: 1 Elite size: 1

Remote island model: Remote island model: 0 Ip file: ip.txt Migration probability: 0.3 Server port: 2929 Reevaluate immigrants: 0

Result: Best fitness: 21.237 Best individual: 0.00813534 0.00780192 0.00924833 0.00341639 0.00561836 0.00234964 0.00570121 0.00113554 26.3971 3.56998 2.83083 29.1006 7.26003 2.61856 69.3996 4.47001 -0.0740829 21.237

Elapsed time: 4402.82 s

User's messages:

## les probs qu'on change les valeurs de sinus sont:

0.00216911 8.55208e-05 0.00386071 0.00554889 0.00357392 0.00967946 0.00657251 0.00577217

0.001051 0.002468 0.004409 0.005455 0.001293 0.007629 0.006655 0.002260

0.00189468 0.000888565 0.000649089 0.00695411 0.00438976 0.000108344 0.00565931 0.00773423

0.008135 0.007802 0.009248 0.003416 0.005618 0.002350 0.005701 0.001136

plot all
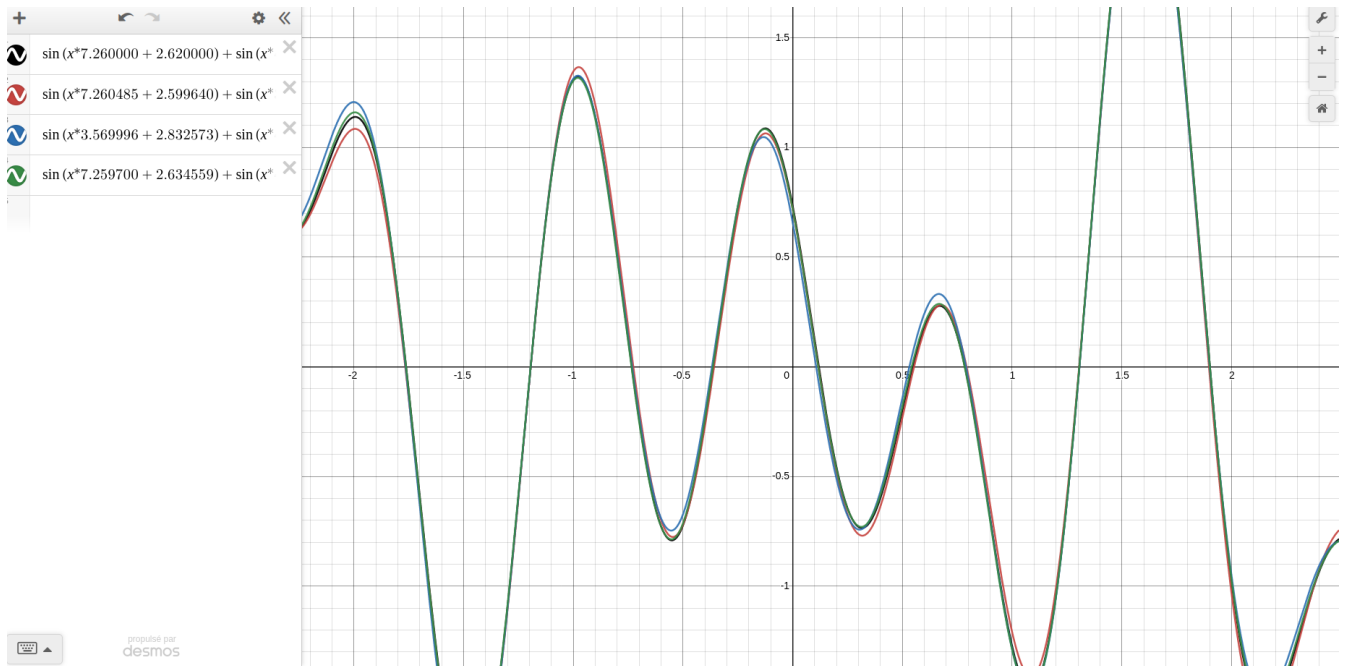
après 100 generation, on trouve que les trois méthodes "points de croisement tombant au milieu d'un sinus, points de croisement entre deux sinus et mutation croisement des point de croisement" ménent au même résulats.

Conclusion

les valeurs x0..x7 évoluent en même temps que le génome (par mutation et croisement) sont proche de 0 ce qui indique que notre modèle est auto-adaptive.

On peut utliser les valeurs de points de croisement pour arrèter l'evolution, au lieu de nombre de generation.