Homework No. 5

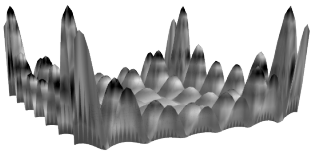
Particle Swarm Optimization

Particle Swarm Optimization is a computational method that optimizes a problem by iteratively trying to improve a candidate solution. PSO can be used to find the global minimum and maximum of sophisticated functions.

What to do?

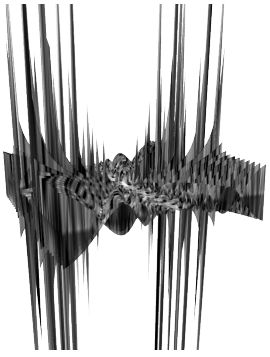
Implement the PSO algorithm with Python to find the global maximum and minimum of f and g, respectively.

$$f(x,y) = \left| \sin x \cos y \exp\left(\left| 1 - \frac{\sqrt{x^2+y^2}}{\pi} \right| \right) \right|, \quad -10 \le x, y \le 10$$



Function f.

$$g(x,y) = x \sin\big(\pi \cos(x) \tan(y)\big) \frac{\sin\left(\frac{y}{x}\right)}{1+\cos\left(\frac{y}{x}\right)}, \quad -100 \le x, y \le 100$$



Function g.

In order to maximize your score, your code must be able to:

- find a point (x, y) such that $f(x, y) > 19.2$.
- find a point (x, y) such that $g(x, y) < -1.7 \times 10^6$.

Upload a zip file containing your source code along with the summary.

Extras

***Extra* Ψ.** Finding the lowest value of g among the students.
***Extra* Γ .** Visualizing the particles and their positions and movements.

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