# Problem 1

Assume 1% of the runtime of a program is not parallelizable. How much speed-up can be achieved by execution on 64 cores, assuming there is no additional overhead for the parallel execution?

Speedup um Faktor 39,26

# Problem 2

This time, assume the program above uses a broadcast operation that incurs an overhead that depends on the number of used cores, P. This overhead is 0.0001 · P. For which number of cores do you get the highest speedup?

Bei 99,5 Kernen wird der maximale Speedup erreicht

import sympy as sp  
x = sp.symbols('x')  
f\_x = 1 / (0.01 + ((1 - 0.01) / x) - 0.0001 \* x)  
f\_prime\_x = sp.diff(f\_x, x)  
f\_prime\_x.simplify()  
solution = sp.solve(f\_prime\_x, x)  
print(solution)

## Problem 3