Welcome! EE5121 - Optimization

↳ Lin algebra
↳ Matlab

TAs
↳ Aggraj
↳ Sushmitha
↳ Jaswanthi
↳ Narendra

Organization

→ Tutorials → Quizes. 55%.
↳ Mid sem exam 25%.
↳ Course project (groups 3) 20%.

Textbook - Nocedal

Introduction

→ Nature - efficiency → humans → optimization!

→ Key ideas
- Identify objective.
- The variables
- Nature of the variables - e.g. constrained or not

→ Joe Keller asked:

(At birth → everyone has a fixed no of heartbeats. How to optimally use the h beats)

So as to live as long as possible?

→ Sleep all the time.

→ Exercise!

Untrained Heart rate: 80 bpm

exercise : 120 bpm.

Person exercise a fraction x of it's time.

On avg, how many heartbeats are used:

$$f(x) = 120x + 80(1-x)$$

instead ↓

$$= 120x + g(x) \cdot (1-x).$$

Untrained: 80
trained: 50

$$g(x) = 50 + 30e^{-100x}$$

Choice

$$f(x) = 120x + \downarrow \quad (1-x)$$

→ exercise 57.7 mins!

Modelling + Solution.

1. find / create a suitable algo to solve the problem
2. Look at the soln → In some problems, there are optimality condns.

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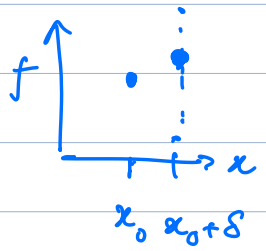
Types of Problems

↳ Continuous v/s discrete problems

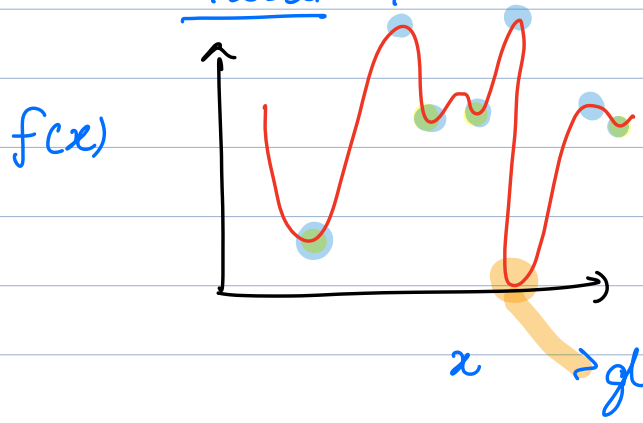
↓

much easier



↳ Constrained v/s unconstrained.

↳ Global v/s local optimization



× Miss global pt