Implementing the genetic algorithm on choosing the parameters of the PID controller

**What is the PID controller?**

* It’s a type of control that is used in applications that require high precision and maintain stability
* Used in autonomous vehicle’s steering control system

**Problem:**

* Tunning the parameters manually is time consuming, inaccurate, and inefficient

**How can we implement the genetic algorithm to choose the optimal kD , kI, kD ?**

* **Gene:** the parameters
* **Chromosome:** set of combinations of the PID parameters
* A black text with black text

  Description automatically generated with medium confidence**Fitness Score:**

A math formula with black text

Description automatically generated with medium confidenceWhere the performance index is:

* **The process will go as follows:**
  + **Initialization**: Generate a random population of PID parameters.
  + **Selection:** Use tournament selection to choose the parents
  + **Crossover:** Multiple point as it will give more exploration
  + **Mutation:** Gaussian Mutation 🡺 adds noise to the PID parameters to create diversity
  + **Termination:** Stop after a number of iterations