

# Algoritmo Genético

SIAI - 2019/2

Seminário 2

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Bruna Zamith (628093)

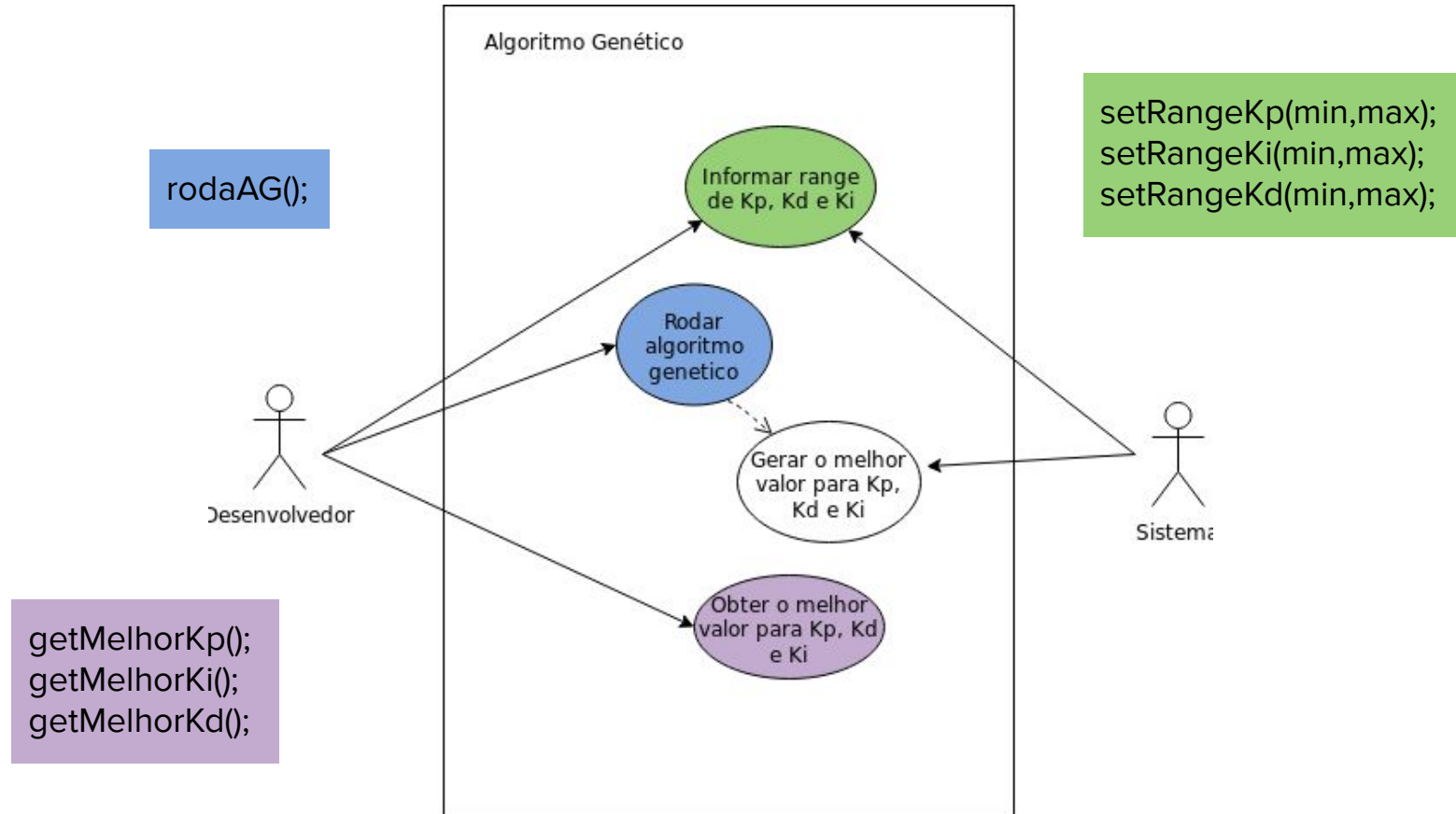
Matheus Vrech (727349)

# AG - Proposta

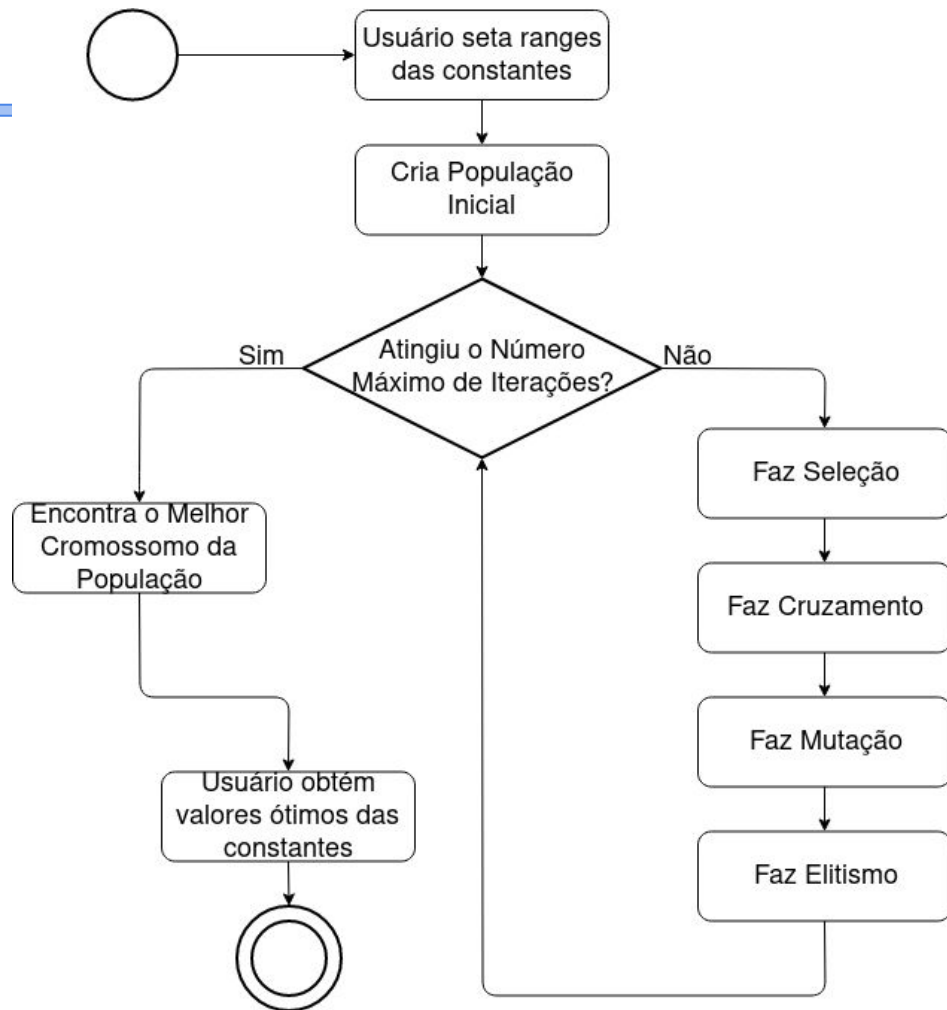
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- Desenvolvedor controla o AG
- Atuação:
  - Antes de entregar o robô
  - Correções periódicas
- Otimização

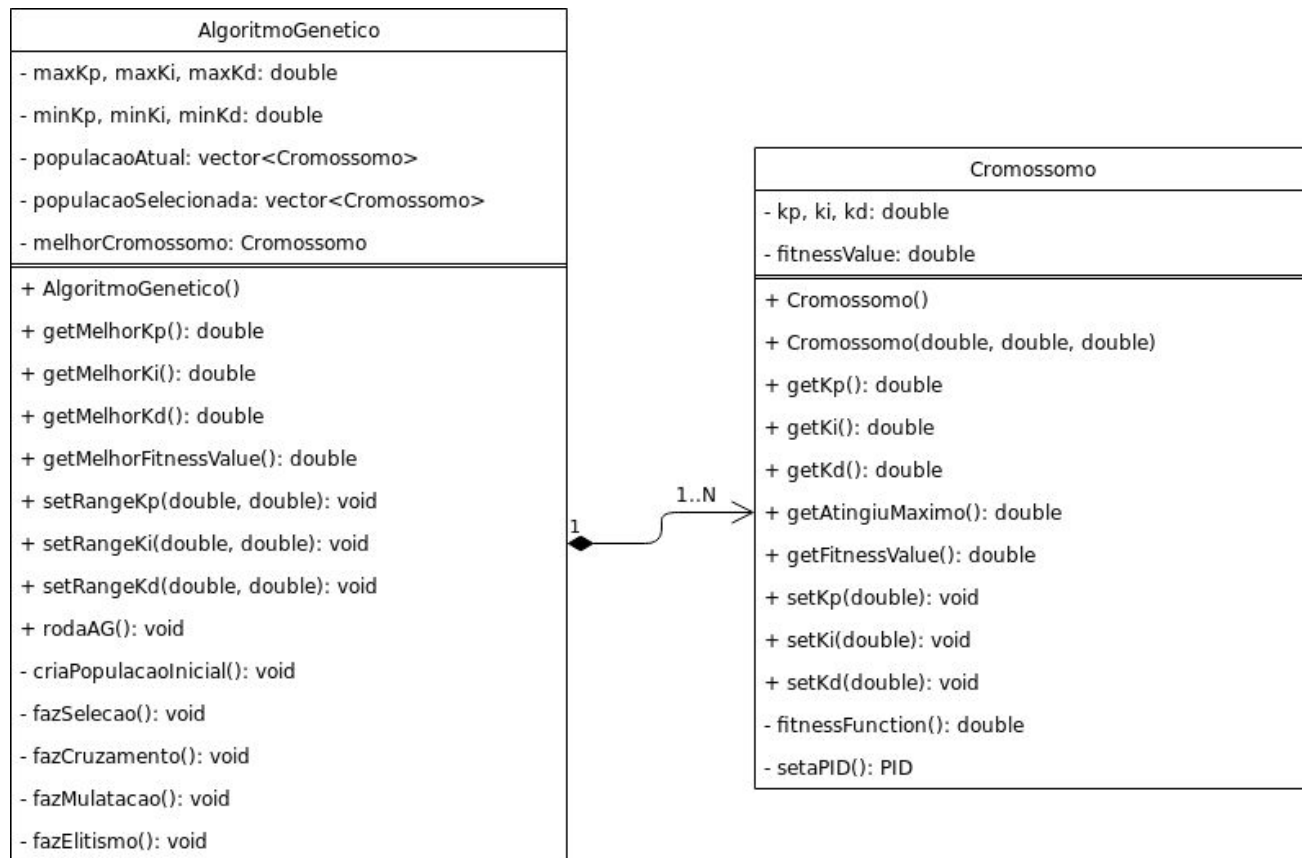
# AG - Diagrama de Casos de Uso



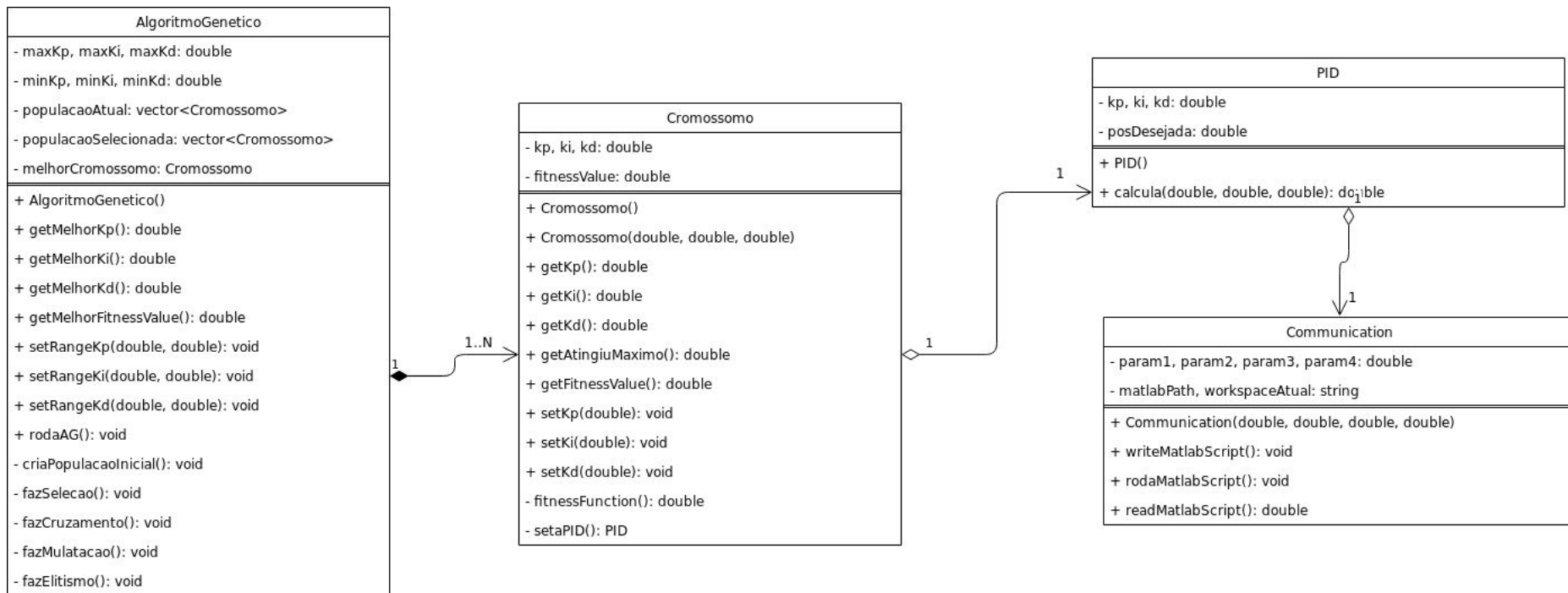
# AG - Diagrama de Atividades



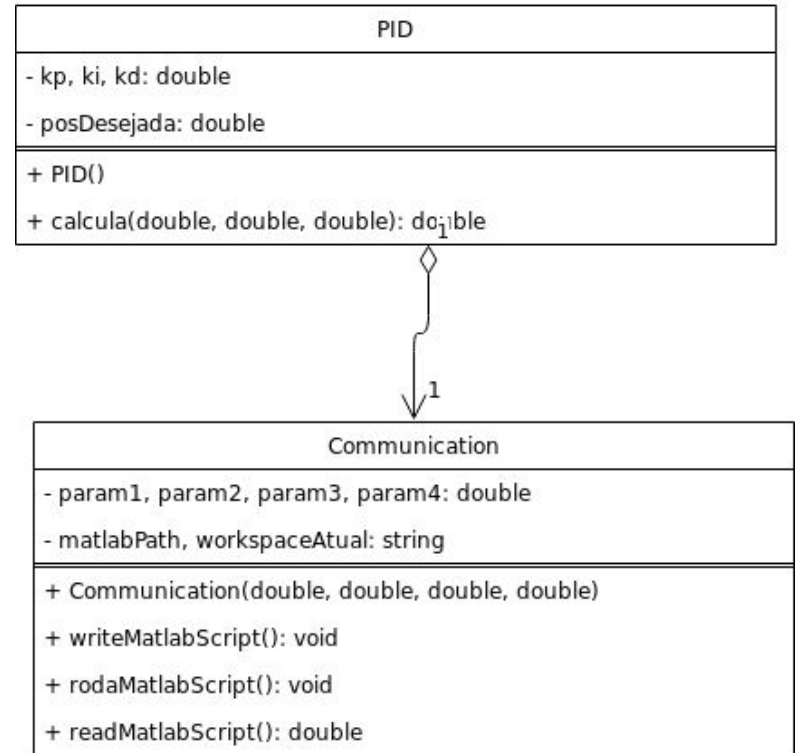
# AG - Diagrama de Classes



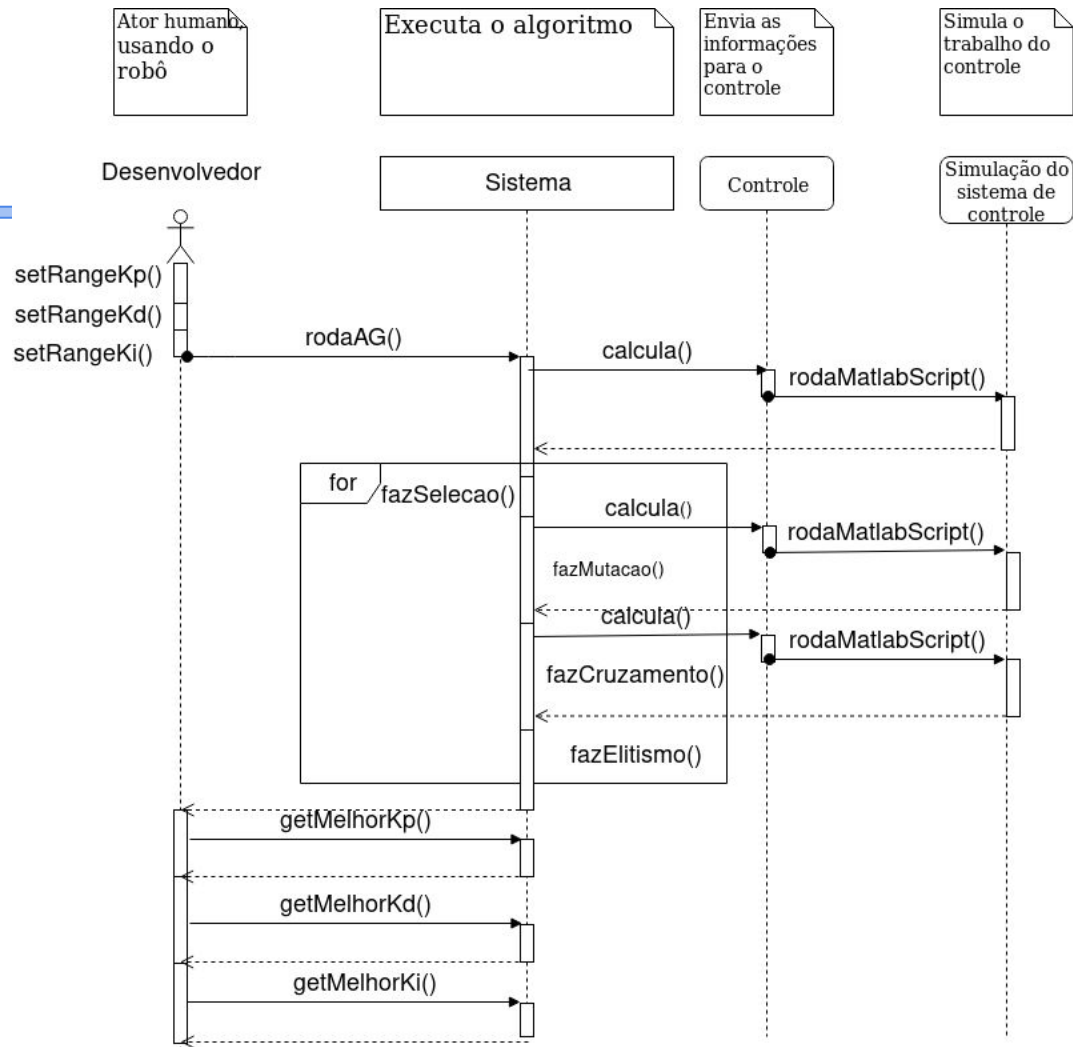
# AG - Diagrama de Classes



# AG - Diagrama de Classes



# AG - Diagrama de Sequências

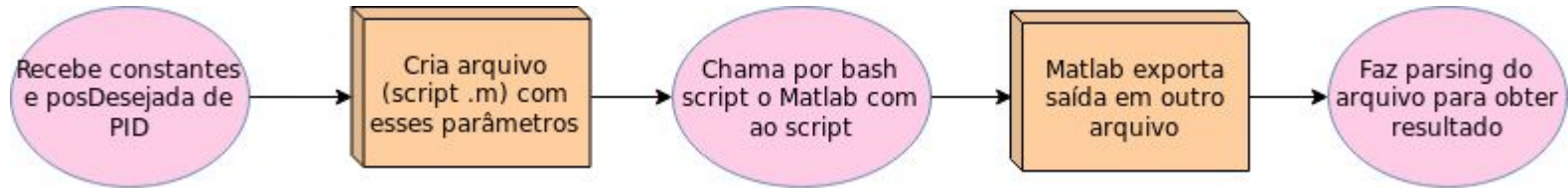




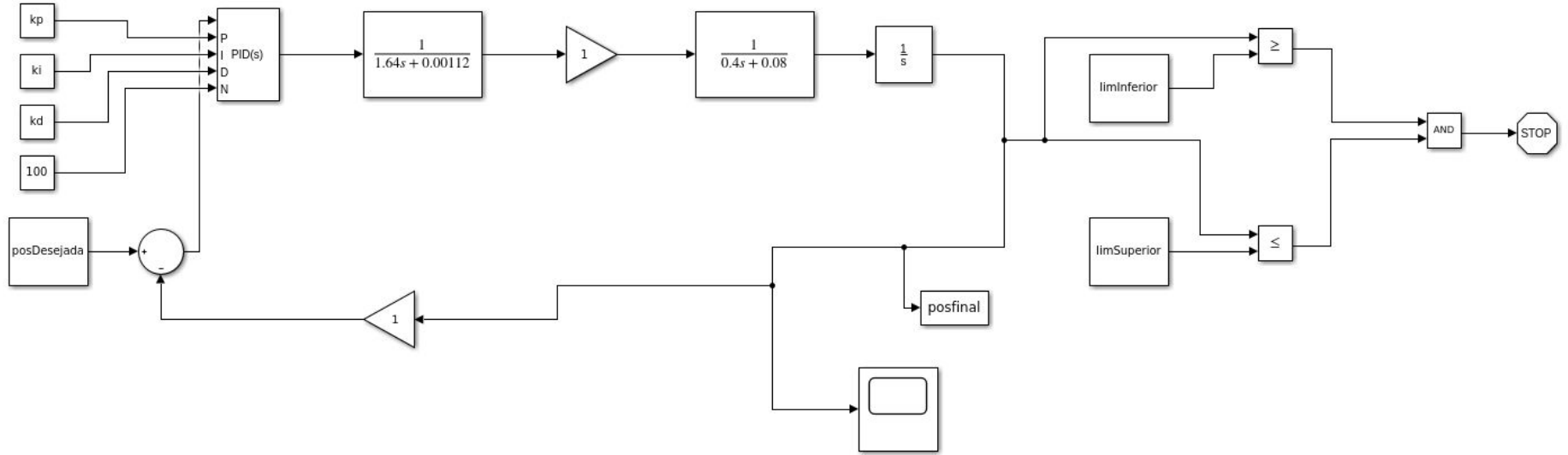
# AG - Comunicação Interna

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- Classe Communication



# AG - Simulação



# AG - Simulação

$L = 0.00112$

$R = 1.64$

$B = 0.4$

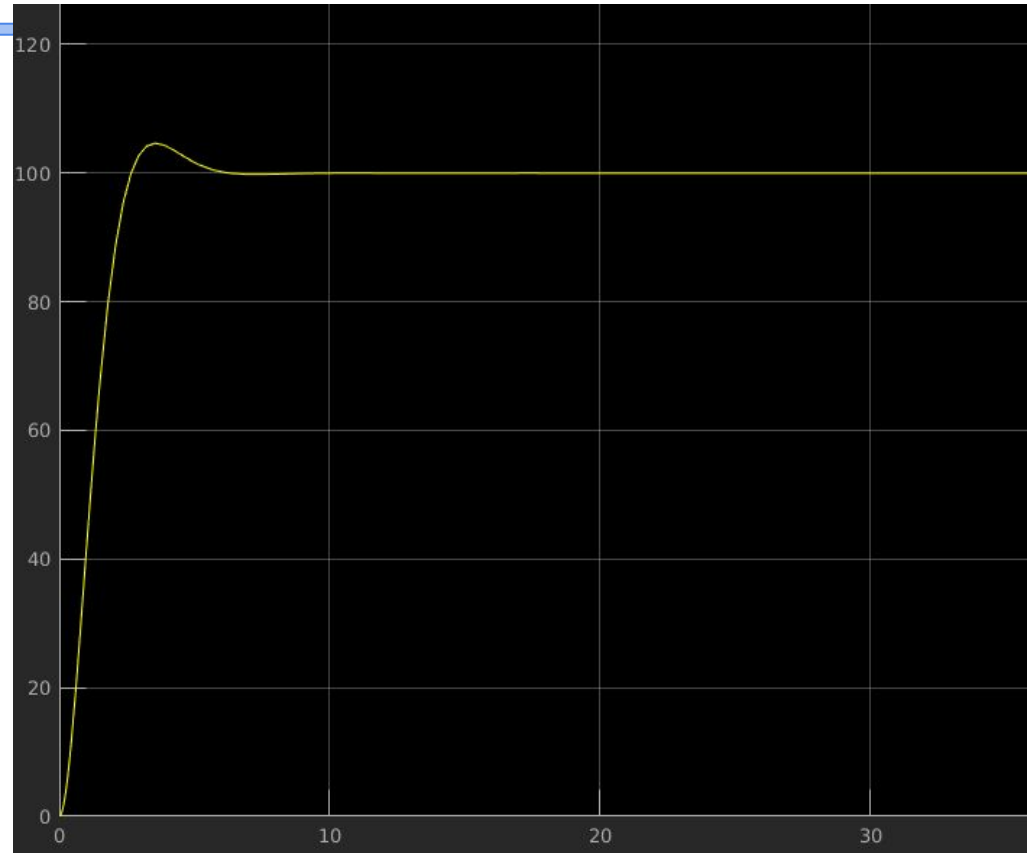
$J = 0.08$

— Retirados de um motor da Maxon e de experimentos da disciplina de Controle

EC-i 30 Ø30 mm, brushless, 30 W, with Hall sensors  
Part number 539473



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# AG - Testes

KP = [1.5 ; 10]

KI = [1 ; 2.5]

KD = [1 ; 1.5]

POS\_DESEJADA = 25

TAM\_POPULACAO = 8

TAM\_SELECAO = 6

TAM\_TORNEIO = 4

NUM\_ITERACOES = 10

Kp = 9.34104

Ki = 2.03431

Kd = 1.33909

Fitness Value = 0.139

```
Cromossomo Inicial 0
kp = 4.67986 ki = 1.8641 kd = 1.203
Kp = 4.67986 | Ki = 1.8641 | Kd = 1.203 | Fitness Value = 0.3353
Cromossomo Inicial 1
kp = 1.73344 ki = 1.91413 kd = 1.09956
Kp = 1.73344 | Ki = 1.91413 | Kd = 1.09956 | Fitness Value = 0.7987
Cromossomo Inicial 2
kp = 3.68999 ki = 1.79173 kd = 1.10455
Kp = 3.68999 | Ki = 1.79173 | Kd = 1.10455 | Fitness Value = 0.4473
Cromossomo Inicial 3
kp = 8.36439 ki = 1.643 kd = 1.18671
Kp = 8.36439 | Ki = 1.643 | Kd = 1.18671 | Fitness Value = 0.1786
Cromossomo Inicial 4
kp = 7.68632 ki = 2.21771 kd = 1.42343
Kp = 7.68632 | Ki = 2.21771 | Kd = 1.42343 | Fitness Value = 0.1641
Cromossomo Inicial 5
kp = 6.18187 ki = 2.35391 kd = 1.09913
Kp = 6.18187 | Ki = 2.35391 | Kd = 1.09913 | Fitness Value = 0.259
Cromossomo Inicial 6
kp = 9.34104 ki = 2.03431 kd = 1.14177
Kp = 9.34104 | Ki = 2.03431 | Kd = 1.14177 | Fitness Value = 0.1621
Cromossomo Inicial 7
kp = 5.20123 ki = 1.70723 kd = 1.33909
Kp = 5.20123 | Ki = 1.70723 | Kd = 1.33909 | Fitness Value = 0.2792
Iteracao 0
Iteracao 1
Iteracao 2
Iteracao 3
Iteracao 4
Iteracao 5
Iteracao 6
Iteracao 7
Iteracao 8
Iteracao 9
Kp = 9.34104
Ki = 2.03431
Kd = 1.33909
Fitness Value = 0.139
```

# AG - Desenvolvido

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- Código principal em C++
- Chama a simulação por bash script
- Comunicação interna por arquivos (matlab script e matlab output)
- Chama simulação do Simulink (PID + Motor)
- Testes.
- Github: <https://bit.ly/2kTEvVZ>

# Dúvidas?