Questionnaire PID (see – ref document P-PD-PID position control of a DC motor)

1. Does the increase of the P (proportional) control gain of a PID position controller

Answer 1: Has no effect on the static error

Answer 2: Reduce the static error .

Kp-Position Proportional gain definitely reduces the static error but does not cancel it

Answer 3: Cancel the static error

2. Does the increase of the Ki (integral) control gain of a position PID controller

Answer 1: Has no effect on the static error

Answer 2: Reduce the static error

Answer 3: Cancel the static error-

The role of the integrator is to cancel the static error, in the limits of the available control amount

3. Does the increase of the Kd (derivative) control gain of a position PID controller

Answer 1: Has no effect on the static error

The derivative contribution is proportional to the velocity, which is null in the steady state- This means that the corresponding contribution of the derivative term is null, in the limits of the quantization error value whose noise may affect the steady state behavior.

Answer 2: Reduce the static error

Answer 3: Cancel the static error

4. Does the increase of the (proportional) P control gain of a PID position controller

Answer 1: Reduce the stiffness of the control

Answer 2: Increase the stiffness of the control

The proportional contribution is proportional to the position. This exactly reproduces a spring behavior, that makes the control as stiff as the proportional gain is higher, in the limits of the stability of the closed loop system.

Answer 3: Has no effect on the stiffness of the control

5. Does the increase of the (derivative) Kd control gain of a position PID controller

Answer 1: Reduce the stiffness of the position control

Answer 2: Increase the stiffness of the control

Answer 3: Has no effect on the stiffness of the control

The derivative contribution is proportional to the velocity and has no effect on the increase of stiffness- It is therefore required to stabilize the behavior when an increase of stiffness is required.

6. Does the increase of the (Integrator) Ki control gain of a position PID controller

Answer 1: Reduce the stiffness of the control

Answer 2: Increase the stiffness of the control

Absolutely YES- The integrator has the role to reduce the error by exactly compensating any disturbance force. The integrator does not allow for any steady state error: it therefore implements an infinite stiffness controller, in the limits of the maximum amount of available control (F/T) value.

Answer 3: Has no effect on the stiffness of the control

7. Which one of the following position's PID control parameters has a direct effect on the viscous behaviour of the controlled mechanism

Answer 1: Kp (proportional)

Answer 2: Kd (derivative)

The derivative contribution is proportional to the velocity and therefore it reproduces a viscous effect. Viscous effect is directly linked to the damping effect.

Answer 3: Ki (integator)