

PID controller

PID controller (or three term controller):

- Stands for A **proportional–integral–derivative controller**
- A PID controller continuously calculates an *error value* $e(t)$ as the difference between a desired setpoint (SP) and a measured process variable (PV) and applies a correction based on proportional, integral, and derivative terms (denoted P , I , and D respectively) which give the controller its name.
- PID controller is used to read the CTE "Cross Track Error", then compute the desired steering output by calculating proportional, integral, and derivative responses and summing those three components to compute the output.
 - P - Controller : Gives steering output which is proportional to current error "CTE" by multiplying the error by the gain factor " k_p "
 - I - Controller : Integration of "CTE" over a period of time, then it is multiplied by a constant " K_i ". It is added to PD-Controller output.
 - D - Controller : Derivative (the rate of change) of the error "CTE" with respect to time, multiplied by another constant " k_d ". It is added to the output of the P-Controller.