



Internetul lucrurilor

Control cu Bucla deschisă

Control On/Off

Control PID

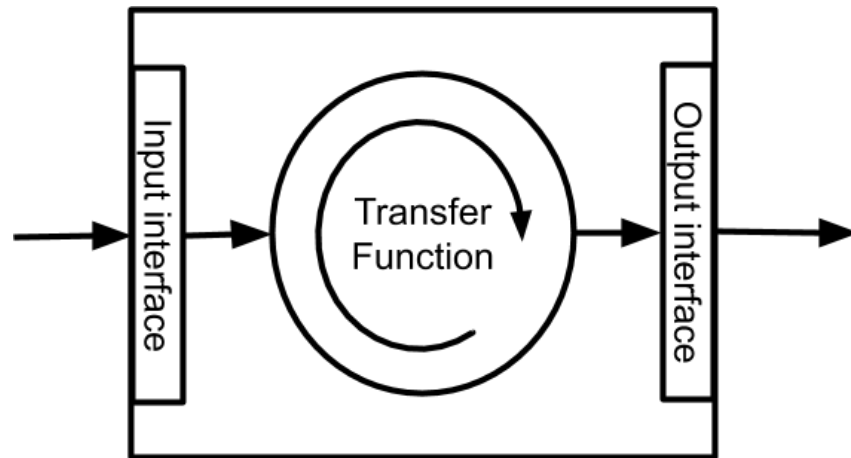
Control evoluție acțiune

Control

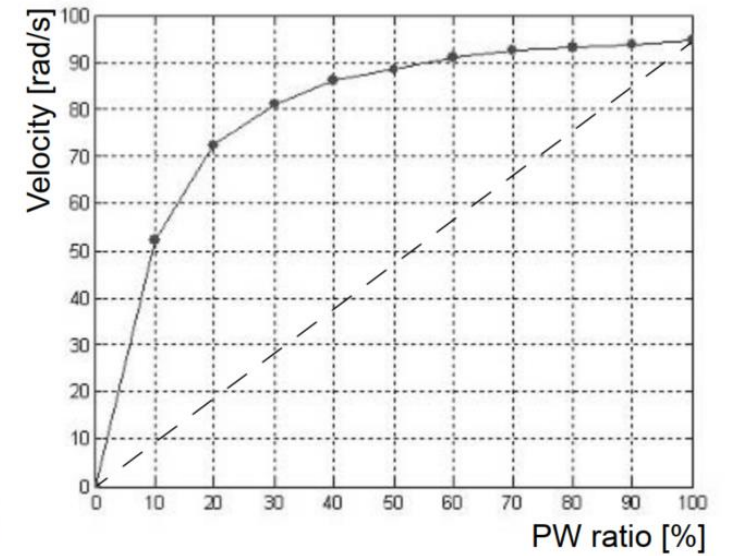
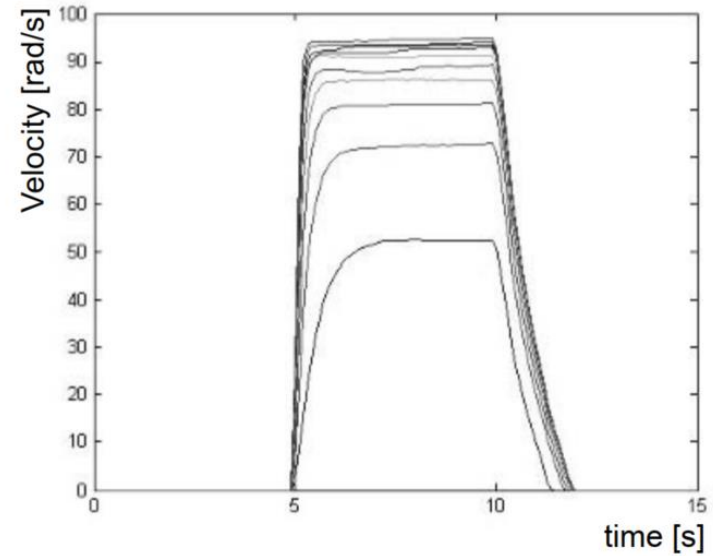
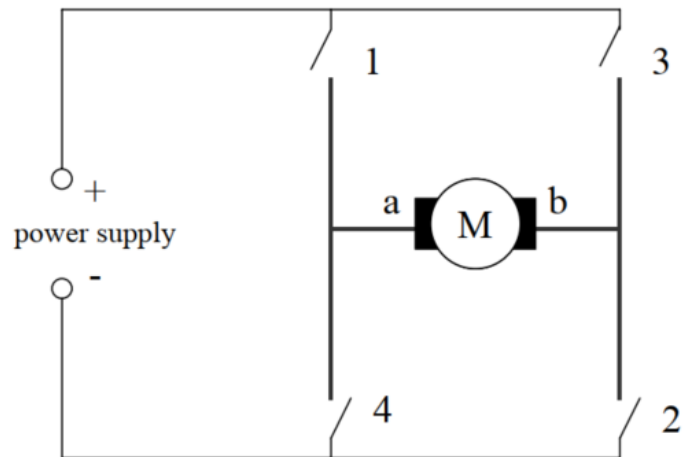
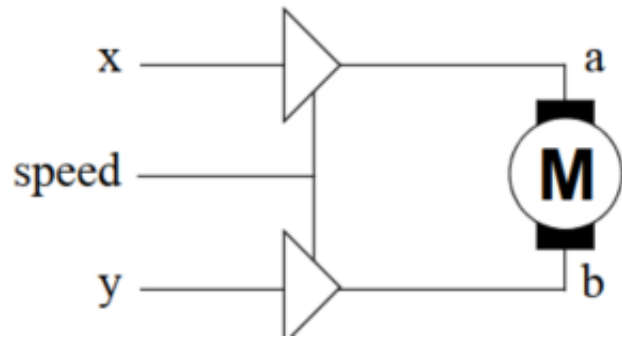
Mentineră unui parametru la o valoare prestabilită

- Bucla Deschisă
- On/Off
- PID

- *Control Fuzzy*
- *Retele Neuronale*
- *Machine Learning*

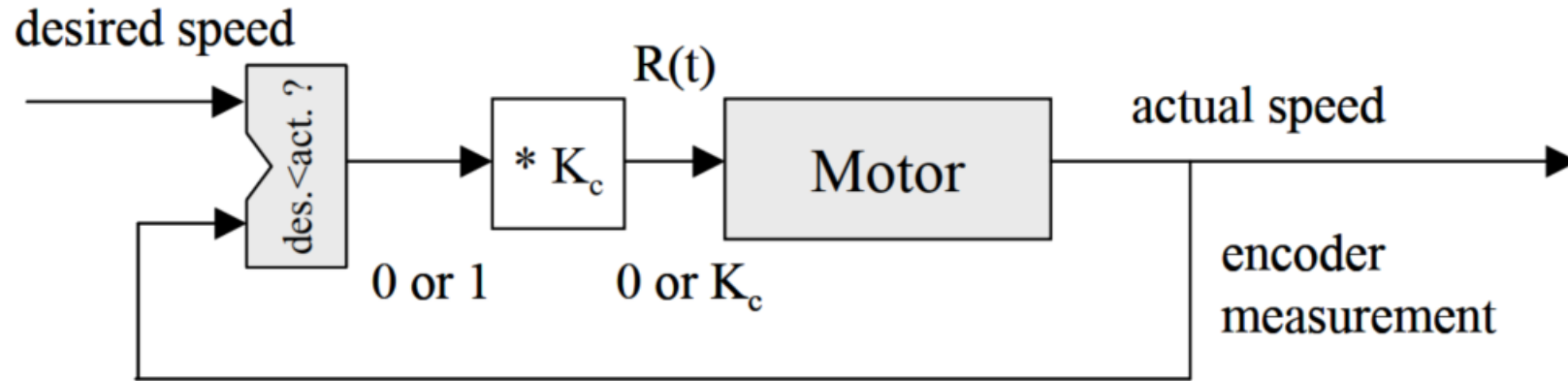


Control In bucla deschisa

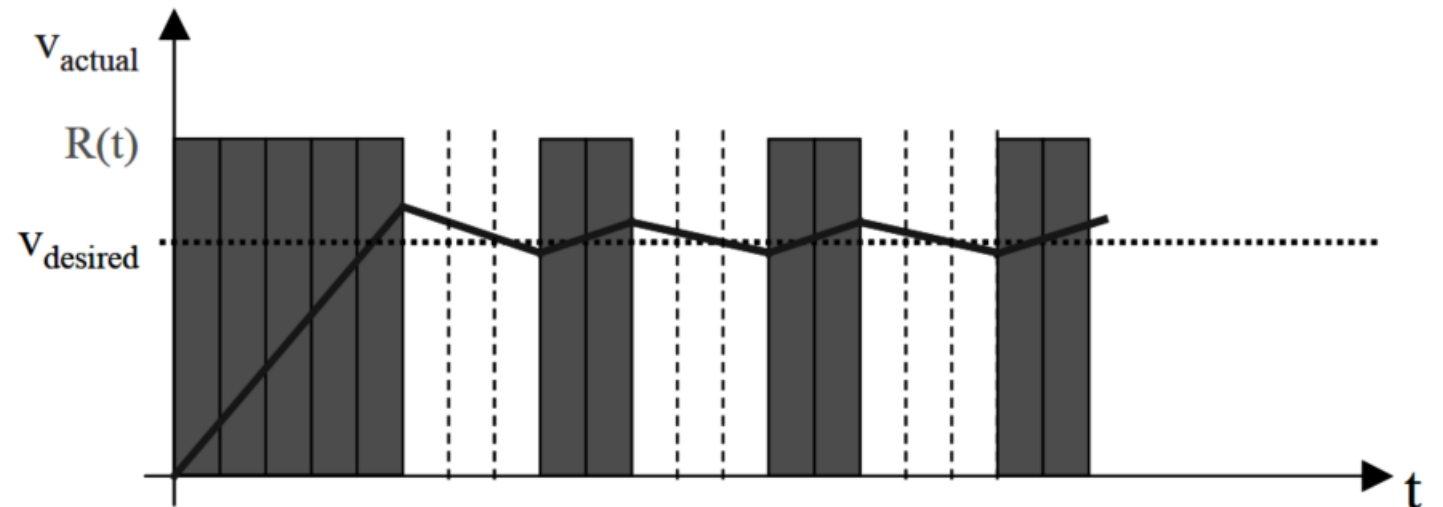


$$\frac{x - x_0}{x_1 - x_0} = \frac{y - y_0}{y_1 - y_0}$$

On-Off Control

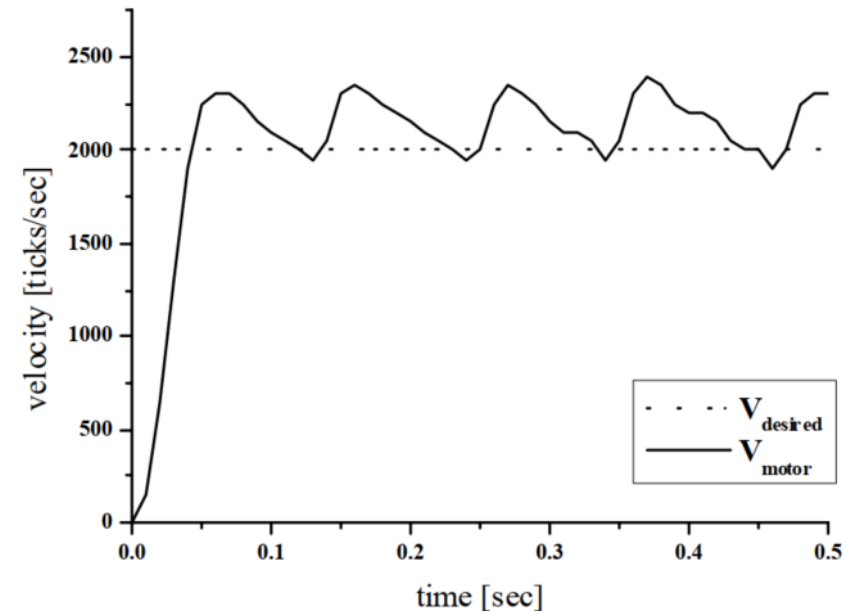
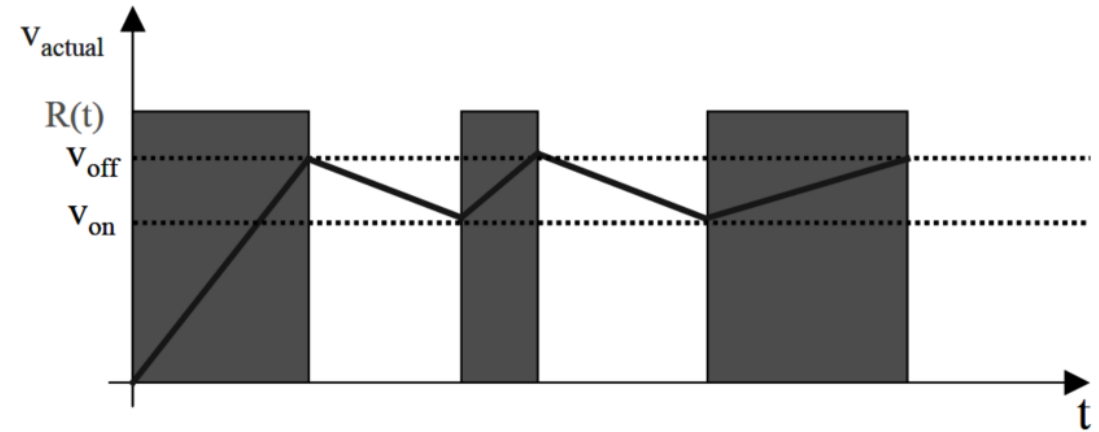
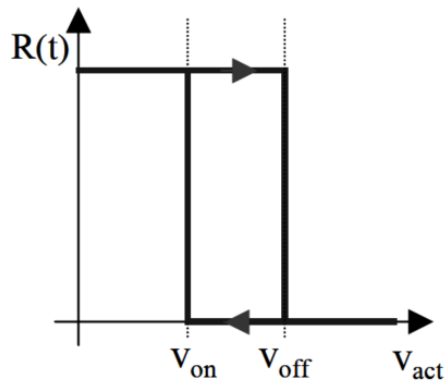


$$R(t) = \begin{cases} K_C & \text{if } v_{\text{act}}(t) < v_{\text{des}}(t) \\ 0 & \text{otherwise} \end{cases}$$

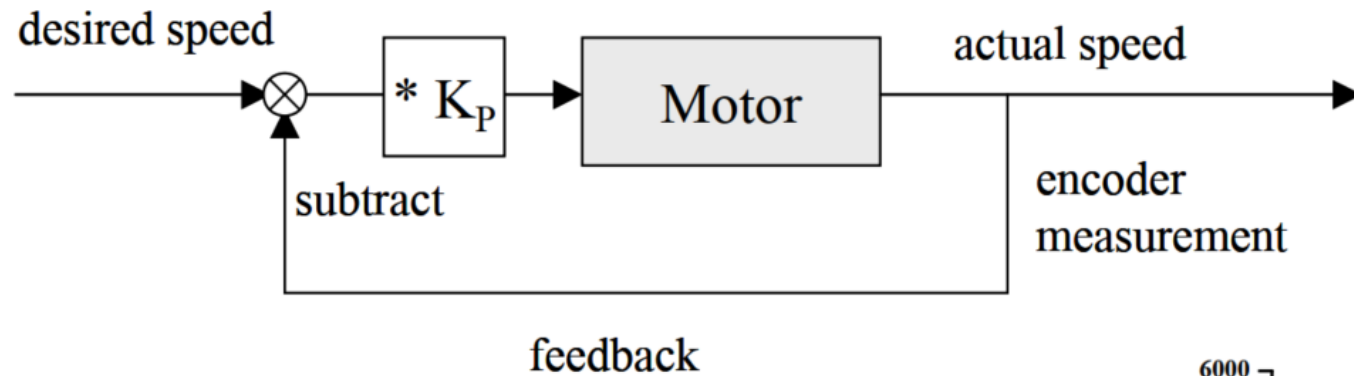


On-Off Control cu histereză

$$R(t + \Delta t) = \begin{cases} K_C & \text{if } v_{\text{act}}(t) < v_{\text{on}}(t) \\ 0 & \text{if } v_{\text{act}}(t) > v_{\text{off}}(t) \\ R(t) & \text{otherwise} \end{cases}$$



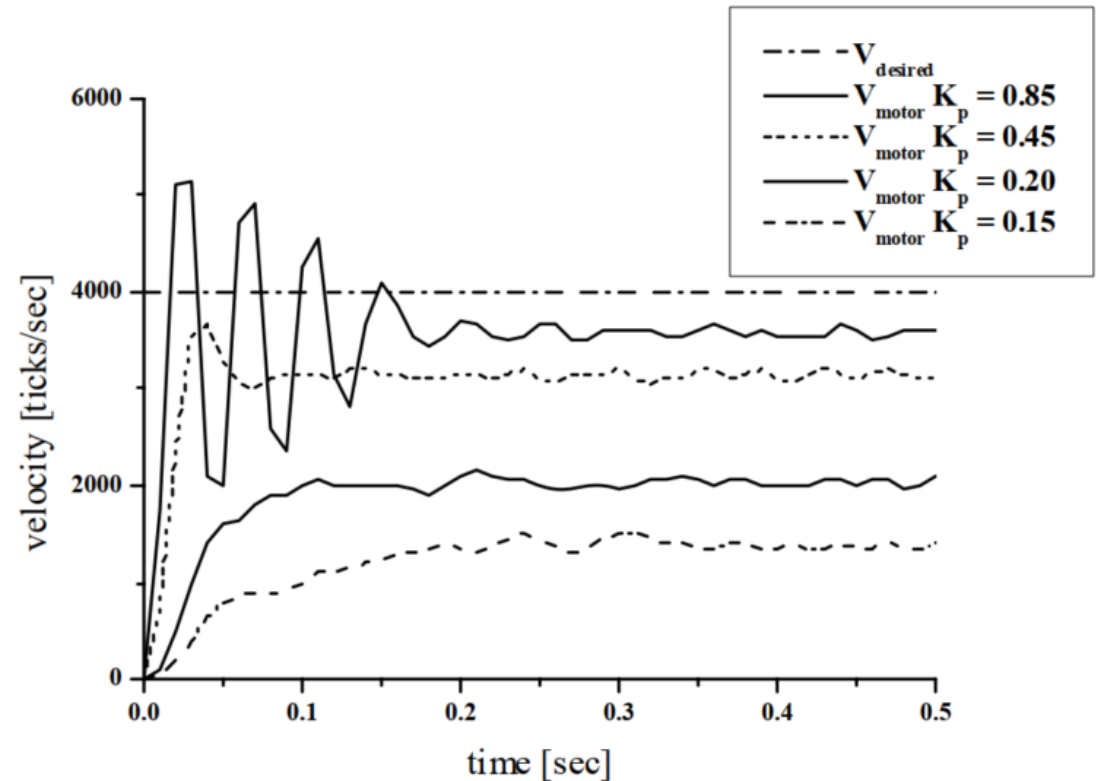
PID Control – Proportional



P - Proportional

$$e = (V_{des} - V_{act})$$

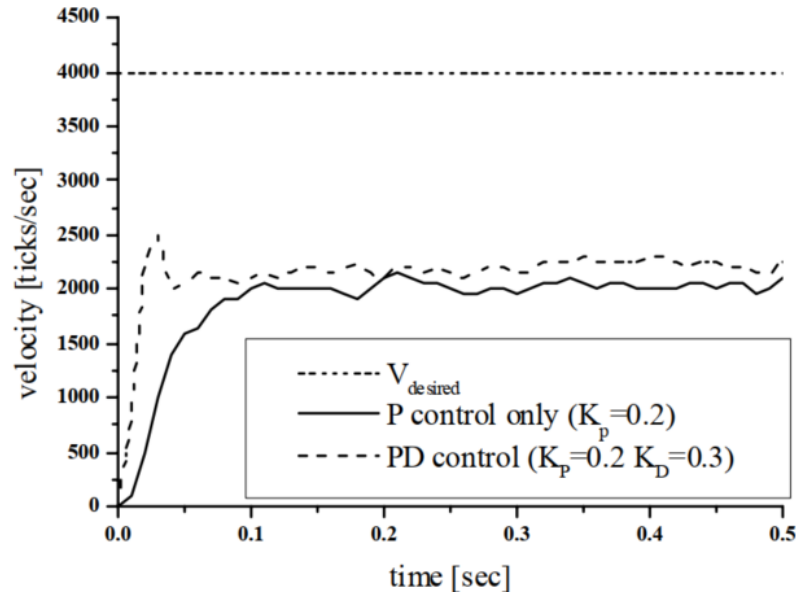
$$R_P(t) = K_P \cdot e(t)$$



PID Control

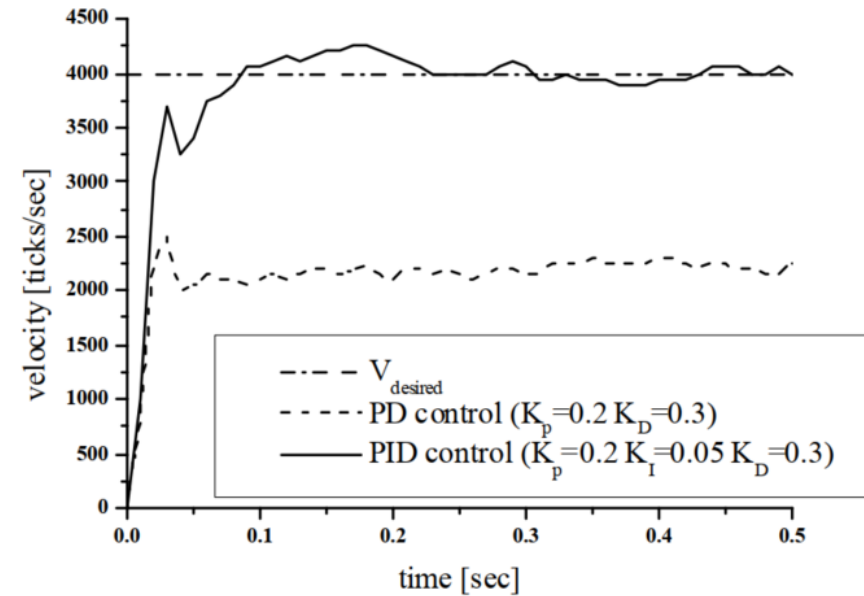
D - Diferențial

$$R_D(t) = K_D \cdot \frac{de}{dt} = K_D \cdot \frac{e(t) - e(t - \Delta t)}{\Delta t}$$



I - Integral

$$R_I(t) = K_I \cdot \int_0^t e(t) dt = K_I \cdot \sum_{k=0}^n e_k \cdot \Delta t$$



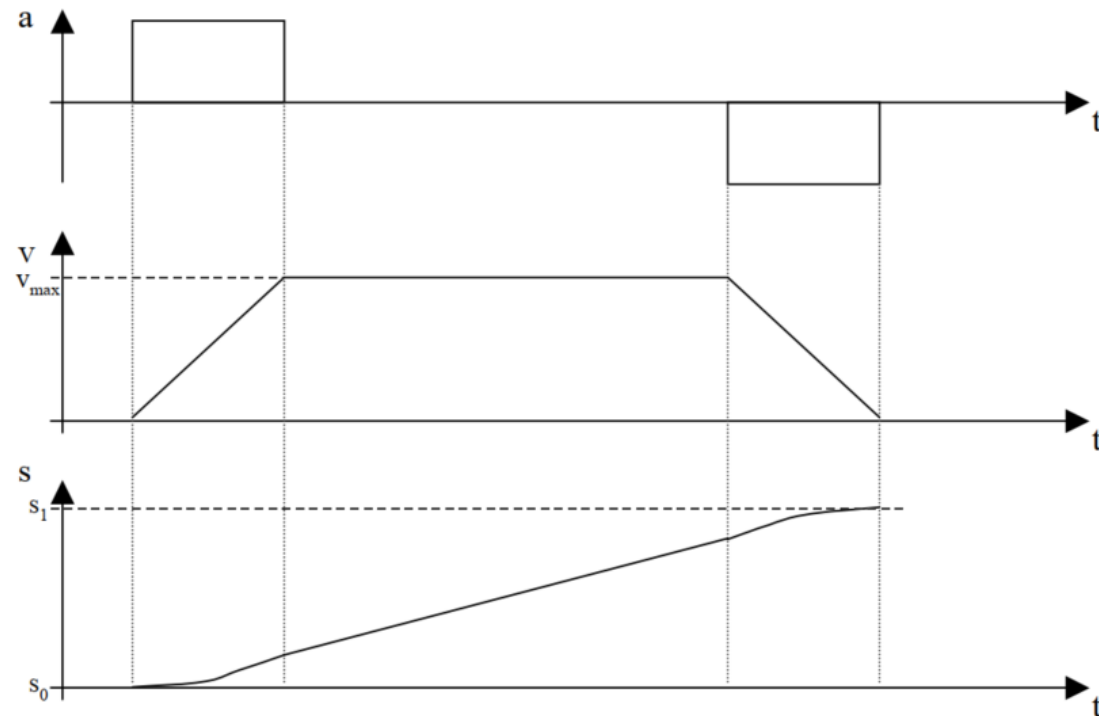
$$R_{PID}(t) = R_P(t) + R_I(t) + R_D(t) = K_P \cdot e(t) + K_I \cdot \sum_{k=0}^n e_k \cdot \Delta t + K_D \cdot \frac{e(t) - e(t - \Delta t)}{\Delta t}$$

PID - Tuning

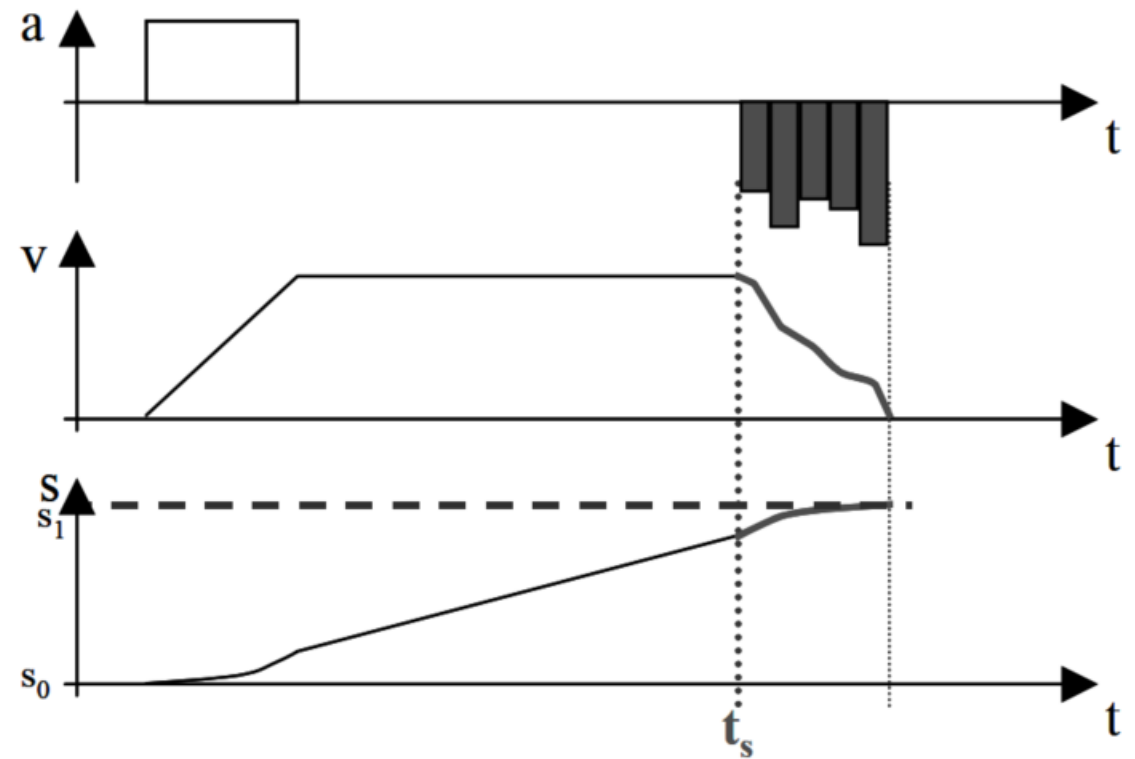
1. Setare Vd dorita , $Kp = 0$, $Ki = 0$, $Kd = 0$
2. Mărire Kp pana la oscilare. împărțire $Kp/2$
3. Mărire Kd pana se observa creștere cu 5-10%
4. Mărire Ki pana la oscilare, împărțire $Ki/2$ sau $Ki /3$
5. Verificare cu diverse valori Vd

Control evoluție și poziție

pornire / oprire lină



adaptare frânare



Control platforma 2WD

