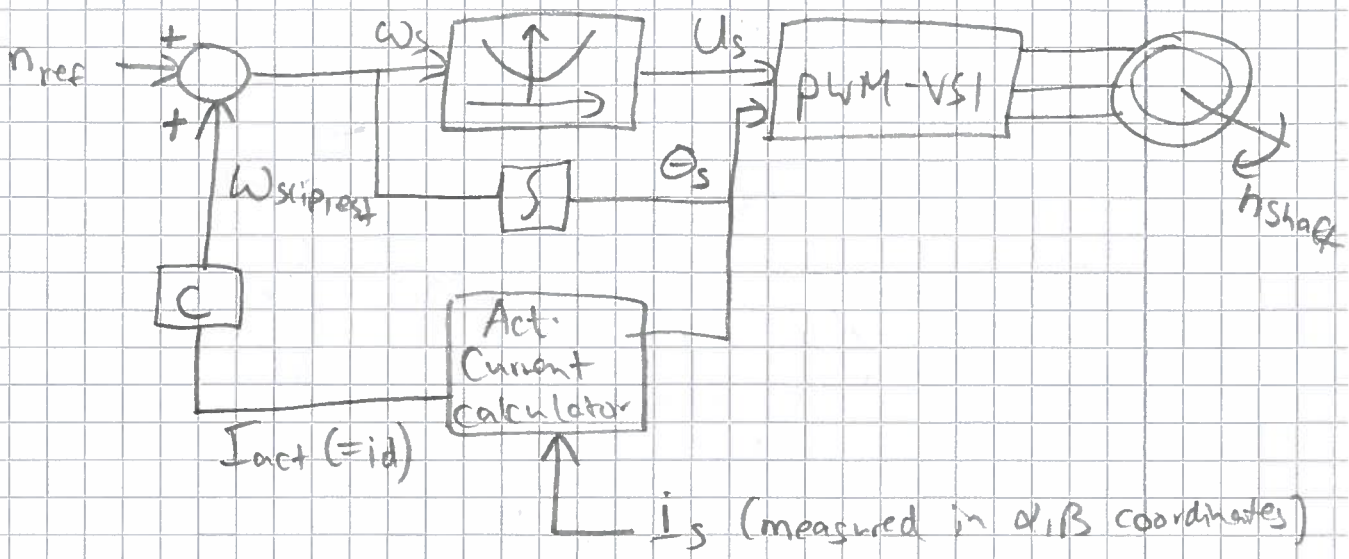
(5) Problem 3:



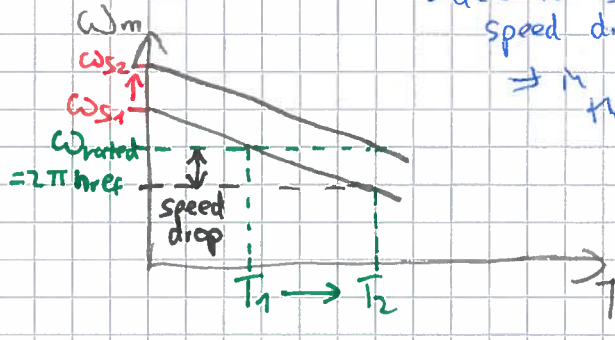
- Targets: • constant shaft speed for any load torque!
  • constant stator flux for high torque production capability

→ Target 2 obtained by adapt the stator voltage U_s for any frequency in order to

$|\bar{\lambda}_s| = \left|\frac{\bar{U}_s}{\omega_s}\right| = \Phi$ (assuming $r_s = 0$)

→ Target 1 obtained by adapting the stator frequency at load changes in order to keep $n_{mech} = \Phi$

• acc. to speed-torque-characteristic the speed drops at increasing torque
⇒ in order to compensate this, increase the stator frequency and hence the synchronous speed



• obtained by following constraints: $T_e \sim \omega_{slip}$

$T_e \sim i_{sd}$

⇒ $\omega_{slip} \sim i_{sd}$

→ measure stator current
→ calculate active part of it
→ use $\omega_{slip} - i_{sd}$ relationship with rated values to calculate an estimated slip that is added to the reference speed in order to calculate the supplied frequency