Supervisor meeting

Wednesday, 27th of April 2016

Parameter Estimation - Optimization

- Remember to reference the previous project regarding parameters.
- The steepest descent is using the gradient then a line search.
- The Newton method is using the gradient and the Hessian then a line search (only suggested direction).
- Squared (^{2}) should be the squared norm (inner product)
- Gauss-Newton method is minimization of a vector function.
- In equation 5.10 - correct the notation regarding vectors.
- Remove left side in equation 5.2 and 5.4.
- Explicitly write the algorithms used.
- Gradient should not be a vector in figure 5.6 and 5.7 on page 27 (gradient is a scalar - give instead a line which leads to the point where the gradient method would make us go)
- Reformulation: This expression can then be used to choose the value of $\boldsymbol{\delta}$ such that THE APPROXIMATION OF f(x) is minimized.
- 2nd derivative in 5.12 should not be P, but instead y_m.
- In equation 5.11 and 5.12 write the derivatives reduced to $\partial \boldsymbol{\theta}^2$.
- Use a known parameter to test how close the estimation gets both with SensTool and our own implementation.
- "Evident from figure 5.2 [...]". Make better/more description and list the parameters used.
- Try to calculate the normed RMS error only until time 3 just to see the difference.
- Write more clearly which is our own implementation between figure 5.11 and 5.12.
- We can just use the line search implemented in matrix course, just remember source.
- Gauss-Newton method, see slide 17-18 lecture 7 in matrix course.

Controller Analysis Section

- Try to calculate the closed loop poles of system with proportional controller. That is, root locus of closed loop with P-controller.
- Root Locus of P-controller confirms the behavior in figure 7.1
- In figure 7.2, correct figure text: It is not a Nyquist plot.
- Block diagram in figure 7.3 is not saying much, however, we could add a K and D'(s) instead of D(s), and then use it to explain how K is scaled to generate the loci.
- Root locus, figure 7.4, better described as using a proportional controller.
- Reformulate conclusion on controller: "This means that another kind of controller in needed, which also takes care of the velocity of the wheel.", we should not imply that it is not possible.
- Reason for pole left of zero is friction in motor.
- Include the transfer function on pole/zero-form with parameters.
- If the torque goes to zero then the velocity would decay because of the motor friction.

State Space Controller

- Working controller! :D
- Continue investigating in frequency domain.
- Focus on making feedback come from the sensors.

Exam Date

- Suggested dates: Friday 17th of June or Monday 20th of June

Next Supervisor Meeting

Wednesday, 4th of May at 13.00