1 Parameter Optimization

1.1 Parameters

Examples

- friction coefficients in the cable reels
- inertia of the arm and in the engine
- mass and mass distribution of the arm

Why?

Parameters are often hard to measure in reality. Control and motion are known on a real excavator. Thus, we identify the parameters this way.

Parameters can change in a long time usage, due to frequent temperature changes, abrasion and dirt. Then, one can measure the actual parameters only this way.

1.2 Black Box

For this purpose, we have received a real excavator model from Siemens. Since the content is valuable and complex, the model is a black box, implemented in MatLab.

Input:

- Control: Actual handling of the operator in the mine
- Parameters

Output:

- Motion: Actual position of the excavator shovel over time

For given trajectories of control and motion, we have to identify the parameters.

1.3 Optimization

Since we have no information about the black box model, we will have to use derivative-free optimization-methods.

For verifying our optimization procedure, we will use the model we have developed so far. For this model, we have all information and we can apply this as a reference, e.g. for error searching.