Technische Universität Berlin **Summer Term 2014**
Fakultät II - Mathematik und Naturwissenschaften
Institut für Mathematik
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Numerical Analysis II
Homework Sheet 12

Exercises
Tutorial on July 14

1. Problem
Apply the procedure (P) in order to determine the differentiation-index of the DAE

$$\begin{bmatrix} 0 & 0 \\ 1 & -t \end{bmatrix} \dot{x}(t) = \begin{bmatrix} -1 & t \\ 0 & 0 \end{bmatrix} x(t) + \begin{bmatrix} f_1(t) \\ f_2(t) \end{bmatrix}.$$

2. Problem
Using procedure (P), determine the maximal constraint level of the DAE arising from physical multi-body systems

$$\begin{aligned} \dot{p}(t) &= v(t), \\ M(p(t))\dot{v}(t) &= f(p(t), v(t), t) - G(p(t), t)^T \lambda, \\ 0 &= g(p(t), t), \end{aligned}$$

where $M(p)$ is positive definite and $G(p(t), t) = \frac{\partial}{\partial p} g(p, t)$ has full row rank.

No Theoretical Homework

Last updated on July 11, 2014.