$S_N =$
$\mu_1, \cdots, \mu_N \subset$
$u(\mu_i)_{i=1}^N$
$[\mu_i]$
$X_N :=$
$u(\mu_i)_{i=1}^N$
Lagrange-
RB-
Raum
$\mu^0 \in$
$u(\mu)$
$[\mu^0]$
k
μ^0
$X_{k,\mu^0} := \partial_\sigma u(\mu^0) : \sigma \in_0^p, |\sigma| \leq k$

Taylor-
RB-
Raum
$\Phi_N =$
$\phi_1, \cdots, \phi_N \subseteq$
X
re-
duzierte
Ba-
sis
Φ_N
$u(\mu^i)$
??
μ^i
u
$\partial_\sigma u$
Φ_N
$X_N \subseteq$
X
$\mu \in$
$u_N(\mu) \in$
X_N
$s_N(\mu) \in$
$_N(\mu), v; \mu) =$
$f(v; \mu) \forall v \in$
X_N
$s_N(\mu) =$
$l(u_N; \mu)$
$f \neq$
l
a
s
??
$P_\mu :$
$X \to$
X_N
μ
sei
a
sym-
metrisch
$u(\mu)$
$u_N(\mu)$
$u_N(\mu) =$
$P_\mu u(\mu)$
$e(\mu) v_\mu =$
0
$\forall v \in$
X_N
$e(\mu) :=$
$u(\mu) -$
$u_N(\mu)$
P_μ
$(X, _\mu)$
$X_N \subseteq$
X
$_\mu u(\mu) -$
$u(\mu) \phi_{i_\mu} =$
$0 \forall i =$
$1, \cdots, N$
$\Leftrightarrow$
$a(P_\mu u(\mu) -$
$u(\mu), \phi_i; \mu) =$
$0 \forall i =$
$1, \cdots, N$
$\Leftrightarrow$
$a(P_\mu u(\mu), \phi_i; \mu) =$
$a(u(\mu), \phi_i; \mu) =$
$f(\phi_i; \mu) \forall i =$
$1, \cdots, N$
$P_\mu u(\mu)$
$e(\mu)$
a
$a(u - u_N, v; \mu) = 0 \forall v \in X_N$
a

$\gamma(\mu) <$
∞
f
l
X_N
f
l
a
f
l
μ
$u_N(\mu)$
$s_N(\mu)$
μ
L_u
L_s
$\Phi_N =$
$\phi_1, \cdots, \phi_N$
X_N
$\mu \in$
${}_N(\mu) :=$
$a(\phi_j, \phi_i; \mu)_{i,j=1}^N \in^{N\times N}$
$l_N(\mu) :=$
$l(\phi_i; \mu)_{i=1}^N \in^N$
$f_N(\mu) :=$
$f(\phi_i; \mu)_{i=1}^N \in^N$
$u_N =$
$u_{N,i}{}_{i=1}^N \in^N$
$A_N(\mu)u_N = f_N(\mu)$
(1)
$u_N(\mu) :=$
$\sum_{i=1}^N u_{N,i}\, \phi_i$
$s_N(\mu) :=$
$l_N^\top(\mu)u_N$

$$a\left(\sum u_{N,j}\, \phi_j, \phi_i; \mu\right) = A_N(\mu)u_{N\,i} = f_{N\,i} = f(\phi_i; \mu)$$

$a(,; \mu)$
Φ_N
N

$$cond_2(A_N) := A_{N\,2} A_N^{-1}{}_2 \leq \frac{\gamma(\mu)}{\alpha(\mu)}$$

$$cond_2(A_N) = \frac{|\lambda_{max}|}{|\lambda_{min}|}$$

(2)
$\lambda_{max}\lambda_{min}$
$A_N(\mu)$
$u_{max} =$
$u_i{}_{i=1}^N \in^N$
λ_{max}

$$u_{max} := \sum_{i=1}^N u_i\, \phi_i \in X_N$$

$\lambda_{max} u_{max}{}^2 =$
$\lambda_{max} u_{max}^\top u_{max} =$
$u_{max}^\top A_N u_{max}$
$=$
$\sum_{i,j=1}^N u_i u_j\, a(\phi_j, \phi_i; \mu) =$
$a\left(\sum_j u_j \phi_j, \sum_i u_i \phi_i; \mu\right)$
$=$
$a(u_{max}, u_{max}; \mu) \leq$
$\gamma(\mu) u_{max}{}^2$

$$u_{max}{}^2 = \sum u_i \phi_i \sum u_j \phi_j = \sum u_i u_j \phi_i \phi_j = \sum u_i^2 = u_{max}{}^2$$

$|\lambda_{max}| \leq$
$\gamma(\mu)$
$|\lambda_{min}| \geq$
$\alpha(\mu)$
$A_h(\mu) \in^{H\times H}$
$A_N(\mu) \in^{H\times H}$
A_h
A_N
A_h
H
$u(\mu)$
$u_N(\mu)$
$e_i \in^n$
i
$u(\mu) \in$
$X_N \Rightarrow$
$u_N(\mu) =$