three problems discussed in [5]. On the one hand, this
moreover, classes of free boundary problems which cover the
In [8] - [11], we analyzed a finite element method for
conditions cause special difficulties.
the motion of interfaces (1) together with the transient
the question of existence and uniqueness we refer to [1].

With respect to the physical interpretation as well as

\[ \bar{w}(0) = 0 \]  \hspace{1cm} (7.1) \]

\[ \bar{w}_n^+ (z, t) \bar{n}^+ + \bar{w}_n^- (z, t) \bar{n}^- = 0 \]  \hspace{1cm} (6.1) \]

\[ \bar{w} \equiv \bar{w}_n^+ = \bar{w}_n^- \]  \hspace{1cm} (5.1) \]

Together with

\[ \bar{w}(0) = 0 \]  \hspace{1cm} (4.1) \]

\[ \bar{w}_n (z, t) = 0 \]  \hspace{1cm} (2.1) \]

\[ \bar{w}_n \equiv \bar{w}_n^+ = \bar{w}_n^- \]  \hspace{1cm} (1.2) \]

according to

\[ \bar{w}(t) = 0, 1 \]  \hspace{1cm} (1.1) \]

\[ \bar{w}_n^+ (z, t) = \bar{w}_n^- (z, t) \]  \hspace{1cm} (1.1) \]

The mathematical formulation of the physical phenomenon

\[ 1. \text{ Introduction} \]

\[ \text{Introduction} \]
Proof of the error bound. The error bound is given below.

In this paper, we develop a method for the problem

\[\lambda^* \in \Lambda^* \varepsilon H \quad \text{and} \quad x^* \in H \quad \text{are the solutions to the problem,}\]

\[\text{for some } \forall \in E.\]

The error bound is given by the following inequality:

\[\|x^* - \lambda^*\|^2 = \|x^* - \lambda^*\|^2 \leq \|x^* - \lambda^*\|^2.\]
The functions

We will reformulate condition (2.2). Let us introduce

the adequate one for our purposes.

The condition \( \mathcal{I} \) could be formulated thus is

\[
\mathcal{I} = (\mathcal{I} + \mathcal{I}^{-1}) \mathcal{H}
\]

with\( \mathcal{H} \) the space of \( (2.10) \).

\( n \in \mathcal{I} \)

For \( \mathcal{I} \) and \( \mathcal{H} \) have the reduced regularity

enforcing \( \mathcal{I} \) and \( \mathcal{H} \) continuous. Otherwise, we remove meaningless

In the case of a class of solution, all other functions

and space.\( \mathcal{H}, \mathcal{I} \) denote the derivatives with respect to time.

\( (x)'(x)\mathcal{H} = (x)'\mathcal{H} \) (2.9)

Here and in the following \( \mathcal{I} \) etc., mean

...
Is a weak solution if for all \( w \in H \) and almost all

\[ f(t) = \int_{-\infty}^{\infty} \varphi(t) \, dt \]

We have the reduced regularity

Since this vanishes anyway, now we are ready to define

\[ (\nabla^2 u)(n) = \lambda^{(n)} \]

Finally we may add a term

\[ (\nabla^2 u)(n+1) = \nabla^2 u + n^2 u = 0. \]

To take into account \((\nabla^2 u)(n+1)\) and to both equations, then we get the relations

\[ (\nabla^2 u)(n+1) + (\nabla^2 u)(n) = 0. \]

This is what we have to multiplicate \((\nabla^2 u)(n+1)\) by \( n \).

Therefore, in order to get the reduced regularity

\[ n^2 u = \sum_{n=1}^{\infty} R_n. \]

Therefore, in order to get the reduced regularity

\[ \sum_{n=1}^{\infty} R_n. \]

In order to get the reduced regularity in the regularity

\[ \sum_{n=1}^{\infty} R_n. \]

Imples

\[ \sum_{n=1}^{\infty} R_n. \]

The fact that \( \sum_{n=1}^{\infty} R_n \) is given by the data \( \sum_{n=1}^{\infty} R_n \) is the continuity condition.

The continuity condition on \( u \) in the terms \( u \) at the points

\[ \sum_{n=1}^{\infty} R_n. \]

Here are the lower products with respect to

\[ \sum_{n=1}^{\infty} R_n. \]

\[ (\nabla^2 u)(n+1) = \lambda^{(n)} + \lambda^{(n)} = \lambda^{(n)} + \lambda^{(n)} \]

\[ (\nabla^2 u)(n+1) = \lambda^{(n)} + \lambda^{(n)} = \lambda^{(n)} + \lambda^{(n)} \]

\[ (\nabla^2 u)(n+1) = \lambda^{(n)} + \lambda^{(n)} = \lambda^{(n)} + \lambda^{(n)} \]

\[ (\nabla^2 u)(n+1) = \lambda^{(n)} + \lambda^{(n)} = \lambda^{(n)} + \lambda^{(n)} \]

Integration over \( \Omega \) leads to

\[ \sum_{n=1}^{\infty} R_n. \]

The multiplication of \( \lambda \) with \( \varphi \) with \( \varphi \) and

\[ \sum_{n=1}^{\infty} R_n. \]

Then (2.2) can be split into

\[ \sum_{n=1}^{\infty} R_n. \]
with \( \mathbf{p} \) being the \( L^2 \)-projection onto \( \mathcal{S}_n \).

\[
0 = (0)_{\mathcal{S}_n} \quad (3.6)
\]

\[
\mathbf{p} = (0)_{\mathcal{S}_n} \quad (3.5)
\]

for \( i \leq j \).

\[
\mathbf{q} = (0)_{\mathcal{S}_n} = (0)_{\mathcal{S}_n} \quad (3.5)
\]

\[
\text{for } x \in \mathcal{S}_n \text{ and } l \in \mathcal{T}_L
\]

\[
(x_i^{(n)})_l + (x_i^{(n)})_l (y^{(n)}_i) b (y^{(n)}_i)_l (y^{(n)}_i)_l = (x_i^{(n)})_l (y^{(n)}_i) b (y^{(n)}_i)_l + (x_i^{(n)})_l (y^{(n)}_i) b (y^{(n)}_i)_l + (x_i^{(n)})_l (y^{(n)}_i) b (y^{(n)}_i)_l
\]

according to

\[
\mathbf{q}_n = \text{Find a pair } (n) \text{ with } u = (n) \text{ and } v = (n) \text{ satisfying } \quad (3.5)
\]

**Theorem:** Let \( u \) be a weak solution and both functions

\[
0 \neq \mathcal{A}_1 u = 0, \quad (3.6)
\]

\[
\mathcal{A}_2 u = (0)_{\mathcal{S}_n}, \quad (3.5)
\]

\[
\text{Together with the initial conditions} \quad (n)_n = 0 \quad (3.24)
\]

\[
\text{and in addition for almost all } t \in I
\]

\[
\mathcal{A}_1 (n) = (n) + (n) + (n)_n = 0 \quad (3.26)
\]

\[
\text{The Finite Element Method}
\]

\[
\left\{ I = 0, x > 0, x > 0, x = 0, x = 0 \right\} = (n) \quad (3.1)
\]
\[ \| z \|_{\infty} \leq \| e \|_{\infty} + \| z \|_{\infty} \] (1.1)

Proposition 1. Let \( \zeta > 0 \) be the radius of convergence of the series.

Theorem 2. Assume \( \zeta > 0 \) is bounded away from \( 1 \).

Lemma 3. For \( \zeta > 0 \) and \( \zeta < 1 \), we can show

\[ \| z \|_{\infty} \leq \| e \|_{\infty} \] (1.2)

Remark. The formulae are somewhat lengthy, but besides

Theorem. For \( \zeta > 0 \) and \( \zeta < 1 \), we can show

\[ \| z \|_{\infty} \leq \| e \|_{\infty} \] (1.3)

Proposition 2. Let \( \zeta \) be \( \zeta \) such that for any choice

\[ \| z \|_{\infty} \leq \| e \|_{\infty} \] (1.4)

Remark. The formulae are somewhat lengthy, but besides...
The second causes no difficulties, the third can be estimated by
\[ \|v\|_{0} + \|v\|_{1} + \|v\|_{2} \leq \|v\|_{0} + \|v\|_{1} + \|v\|_{2} \leq \|v\|_{0} \quad (12) \]

The first term on the right hand side is bounded by
\[ \left( \|v\|_{0} + \|v\|_{1} + \|v\|_{2} \right) \|v\|_{1} \leq \|v\|_{0} \quad (13) \]

The second term in (3.8) may be estimated by
\[ \|v\|_{0} \quad (14) \]

and in (3.9) and on the right hand side are dependent on the
\[ \left\{ \|v\|_{0} + \|v\|_{1} + \|v\|_{2} \right\} \|v\|_{1} \leq \|v\|_{0} \quad (15) \]

which by means of Young's inequality may be estimated by
\[ \left\{ \|v\|_{0} + \|v\|_{1} + \|v\|_{2} \right\} \|v\|_{1} \leq \|v\|_{0} \quad (16) \]

In this way we come to the estimate of the first term in
\[ \left\{ \|v\|_{0} + \|v\|_{1} + \|v\|_{2} \right\} \|v\|_{1} \leq \|v\|_{0} \quad (17) \]

For functions \( v \in \mathcal{D} \) we get because of Proposition 2: