

Structure Editing of Handwritten Mathematics

→ Writing mathematical documents in a computer is difficult;

Some Reasons:

- Keyboards do not support all symbols;
- Used languages are verbose;

Example:

$$[f. (m \nabla n) = f. m \nabla f. n]$$

LaTeX:

```
$[ \sim f. ( m \bigtriangledown n ) = f. m \bigtriangledown f. n \sim ]$
```

Goal: Create a Tablet Pe application for writing and editing handwritten mathematical documents.

Details:

- Oriented to the mathematics used in Algorithmic Problem Solving;
- Combined writing of mathematics and text;
- Dynamic structure manipulation.

State of the Art

→ Existing applications:

- Oriented to schoolbook mathematics;
- Do not support combined writing of mathematics and text;
- Concerned with obtaining a final result and not with manipulation of formulae.

Recognition

Problems with mathematics recognition:

- Too many different symbols;
- No universal dictionary of valid expressions;
- Two dimensional writing; e.g. x^2
- Same symbol, different meaning;

e.g. $\int \sin x$ dx and dx + zy

Recognition

- Creating a recognizer is a difficult task ;
- There are several recognizers but none of them is suitable ;
- We have Hough's recognizer for individual symbols ;
- We will have to create the structure Recognition .

Structure Selection

- Structure is very important in mathematics;
- Existing applications do not handle structure appropriately;

Example:

$$[f.(m \nabla n) = f.m \nabla f.n]$$

Gestures

- Useful for dynamic writing;
- Easier to use than buttons.

Examples:



Scratchout - Delete



DownLeft - Add vertical space



Circle - Select

Architecture

