

WORK SUMMARY

The Idea:

Our main idea is to effectively render mathematic equations in an auditory format. The proposed idea is to make use of non-speech paralinguistic cues to convey the mathematic equation to the listener.

The Problem:

The idea was to divide the problem into 4 sub-problems and develop 4 sub-systems. The 4 sub problems are as follows.

1. Basic audio rendering of mathematic equations:

This step deals with rendering mathematic equations in audio. We have chosen the input format for the mathematic equations to be presentation markup mathML. The result of this step is the spoken output of a mathematic equation. The equation is read as it is. That is, like any other English sentence.

2. Use of meta-cues or para-linguistic cues:

In this step, we build upon the base system built in step one. In this step, we make use of additional paralinguistic cues to render the mathematic equation. These cues include;

- Pauses to convey certain parts of an equation.
- Sounds to indicate certain symbols and mathematical operations.
E.g.: Sounds to indicate superscripts, subscripts and parentheses.

3. Use of tonal variations:

In this step, we build up on the system built as a part of step one. We use pitch and rate changes to denote certain mathematic attributes. The pitch and rate increase while speaking out the superscript text and decrease while speaking the subscript text. The system does the same with fractions.

4. Use of 3D sounds (spatial orientation sounds):

In this step, we build upon the system developed in step one. We made an attempt to add 3-D effect to the spoken equation at appropriate places. We have not been able to produce highly distinguishable outputs.