MathMotion by Anim8

Goal

To make Math more visual

The Problems

The inspiration for the product was provided by three main problems:

1) Doing Math

"Pencil and Paper" – this is the primary way that students learn and do Mathematics. Each step is written in a sequence, one line under the next. Despite massive innovations in computer technology in recent years, pencil and paper are still the main tools for solving basic equations.

What if instead students could use a desktop, tablet, or smart phone, where all the steps of a solution can be integrated into a final animation?

2) Teaching Math

Recall the first time you saw the 'x' change sign when it moved to the other side of the equality sign? A good teacher can make learning such a concept way easier for students. What if students were learning by themselves? Or what if they required more assistance? Schools and learning environments are different for every student depending on where they are from or what schools they go to. We believe that every student should be given a fair chance at learning math.

3) Presenting Math

Technical presentations often include line after line of equations. What if this messy technique could be replaced by something more elegant, exciting and comprehensible? We are inventing software that provides an easy way for researchers to animate their equations.

Technical Solution: "MathMotion"

Our solution represents a mathematical equation or expression that has been entered by the user as a tree structure in Javascript. This is the backbone which helps to define, structure, and represent all subsequent manipulations on the equation. Depending on the actions the user takes (for example, moving a variable to the other side of the equality sign; or distributing an operand through a bracket symbol, etc.), the tree structure is modified accordingly. The final result is displayed and the process of obtaining the result is also shown as an animation. Consider the following sequence of images which are obtained from a [really] coarse prototype:

1. Figure 1 shows an equation.

Figure 1.

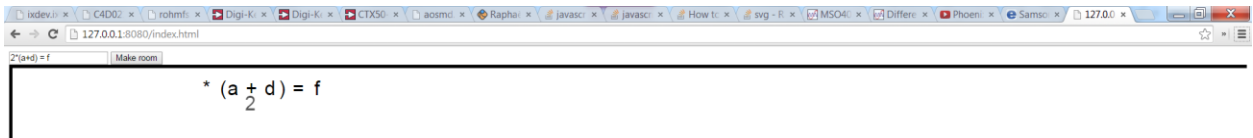2. In figure 2, the user pulls the '2' in to the bracket in order to distribute it.

Figure 2.

3. Upon releasing the '2', the result of the manipulation is then displayed as in figure 3.

Figure 3.

4. Now consider the expression in figure 4.

Figure 4.

5. Figure 5 shows the final result of an animation which distributes the term 'a' in to the brackets. The trajectories of the distribution animation are shown for more clarity.

Figure 5.