



MathJAX Library

@June 23, 2022

Documentation of Project:

MathJAX is an open-source JavaScript display engine for TeX/LaTeX, MathML, and AsciiMath notation that is compatible with all browsers. It was designed with the aim of compiling web technologies into a single, definitive, math-on-the-web platform supporting the major browsers and operating systems. In this video, I plan to show viewers how to use MathJAX to display mathematical notations on the web with its proper format and signs using two of the three above mentioned notation, namely TeX and MathML notation. I will explain using the same text, the quadratic equation and an example and go over the code and tags for both notations.

Presentation:

5 minutes video

Outline -

1. What is MathJAX and how is it used?
2. The two ways to implement, and its code

Script -

MathJAX is an open-source JavaScript display engine for LaTeX, MathML, and AsciiMath notation that is compatible with all browsers. It was designed with the aim of compiling web technologies into a single, definitive, math-on-the-web platform supporting the major browsers and operating systems.

MathJax is modular, so if required, it loads particular components, and can be extended to include new capabilities as per users needs. MathJax is highly configurable and customizable, allowing authors to customize it for their own special requirements. It also has a reliable application programming interface (API) that is used make the mathematics notations on web pages interactive and dynamic.

To put mathematics in your web page, you can use TeX and LaTeX notation, MathML notation, AsciiMath notation, or a combination of all three within the same page. In this video we are going to focus on Text and MathML notation.

In TeX, format is displayed using *math delimiters* that surround the mathematical notation. The default math delimiters are `$$...$$` and `\[...\]` for displayed mathematics, and `\(...\)` for in-line mathematics.

explain code

We see that TeX is both a program and a format that gives you the basics to work with, while we also have LaTeX that is a generalised set of macros that lets you do things easily.

In MathML, you mark your mathematics using standard `<math>` tags, where `<math display="block">` represents displayed mathematics and `<math display="inline">` or just `<math>` represents in-line mathematics.

explain code

Points -

What is MathJAX and how is it used?

MathJax is an open-source JavaScript display engine for LaTeX, MathML, and AsciiMath notation that works in all modern browsers. It was designed with the goal of consolidating the recent advances in web technologies into a single, definitive, math-on-the-web platform supporting the major browsers and operating systems, including those on mobile devices.

MathJax is modular, so it loads components only when necessary, and can be extended to include new capabilities as needed. MathJax is highly configurable, allowing authors to customize it for the special requirements of their web sites. Finally, MathJax has

a rich application programming interface (API) that can be used to make the mathematics on your web pages interactive and dynamic.

To put mathematics in your web page, you can use TeX and LaTeX notation, MathML notation, AsciiMath notation, or a combination of all three within the same page.

Ways to Implement?

TeX :

Mathematics that is written in TeX or LaTeX format is indicated using *math delimiters* that surround the mathematics. The default math delimiters are `$$...$$` and `\[...\]` for displayed mathematics, and `\(...\)` for in-line mathematics.

Difference between TeX and LaTeX

TeX is both a program (which does the typesetting, [tex-core](#)) and format (a set of macros that the engine uses, [plain-tex](#)). Looked at in either way, TeX gives you the basics only. If you read the source for *The TeXBook*, you'll see that Knuth wrote more macros to be able to typeset the book, and made a format for that.

LaTeX is a generalised set of macros to let you do many things. Most people don't want to have to program TeX, especially to set up things like sections, title pages, bibliographies and so on. LaTeX provides all of that: these are the 'macros' that it is made up of.

MathML :

For mathematics written in MathML notation, you mark your mathematics using standard `<math>` tags, where `<math display="block">` represents displayed mathematics and `<math display="inline">` or just `<math>` represents in-line mathematics.

MathML notation will work with MathJax in HTML files, not just XHTML files, even in older browsers.

Resources Used -

- <https://www.mathjax.org/#gettingstarted>
- <https://docs.mathjax.org/en/v2.7-latest/mathjax.html>
- <https://docs.mathjax.org/en/latest/basic/mathematics.html>

Code -

Tex

```
<html>
  <head>
    <title>MathJax TeX</title>
    <script src="https://polyfill.io/v3/polyfill.min.js?features=es6"></script>
    <script type="text/javascript" id="MathJax-script" async src="https://cdn.jsdelivr.net/npm/mathjax@3/es5/tex-ctml.js"></script>
  </head>
  <body> If \((a \neq 0)\), we have two solutions to \((ax^2 + bx + c = 0)\) and they are  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ 
    So, say our equation is \((x^2 - 2x - 15 = 0)\), we can find the zeroes of the equation by using the above quadratic formula as such:
     $x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-15)}}{2(1)}$ 
    We then get the factors of the equation to be either \((x = 5)\) or \((x = -3)\)
  </body>
</html>
```

MathML

```
<html>
  <head>
    <title>MathJax MathML</title>
    <script src="https://polyfill.io/v3/polyfill.min.js?features=es6"></script>
    <script type="text/javascript" id="MathJax-script" async src="https://cdn.jsdelivr.net/npm/mathjax@3/es5/mml-ctml.js"></script>
  </head>

  <body>
    <p>
      If
      <math xmlns="http://www.w3.org/1998/Math/MathML">
```

```

<mi>a</mi><mo>+</mo><mn>0</mn>
</math>,
we have two solutions to
<math xmlns="http://www.w3.org/1998/Math/MathML">
  <mi>a</mi><msup><mi>x</mi><mn>2</mn></msup>
  <mo>+</mo> <mi>b</mi><mi>x</mi>
  <mo>+</mo> <mi>c</mi> <mo>=</mo> <mn>0</mn>
</math>
and you can find them using:
<math xmlns="http://www.w3.org/1998/Math/MathML" display="block">
  <mi>x</mi> <mo>=</mo>
  <mrow>
    <mfrac>
      <mrow>
        <mo>+</mo><mn>2212</mn></mo>
        <mi>b</mi>
        <mo>+</mo><mn>0081</mn></mo>
      </mrow>
      <msqrt>
        <msup><mi>b</mi><mn>2</mn></msup>
        <mo>+</mo><mn>2212</mn>
        <mn>4</mn><mi>a</mi><mi>c</mi>
      </msqrt>
    </mfrac>
  </mrow>
</math>
</p>

<p>
  So, say our equation is
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <msup><mi>x</mi><mn>2</mn></msup>
      <mo>-</mo> <mo>2</mo><mi>x</mi>
      <mo>-</mo> <mi>15</mi> <mo>=</mo> <mn>0</mn>
    </math>
    , we can find the zeroes of the equation by using the above quadratic formula as such:
    <math xmlns="http://www.w3.org/1998/Math/MathML" display="block">
      <mi>x</mi> <mo>=</mo>
      <mrow>
        <mfrac>
          <mrow>
            <mo>+</mo><mn>2212</mn></mo>
            <mo>(1)</mo>
            <mo>+</mo><mn>0081</mn></mo>
          </mrow>
          <msqrt>
            <msup><mo>1</mo><mn>2</mn></msup>
            <mo>+</mo><mn>2212</mn>
            <mn>4</mn><mi>(1)</mi><mi>(-15)</mi>
          </msqrt>
        </mfrac>
      </mrow>
    </math>
  </p>

  <p>
    <math xmlns="http://www.w3.org/1998/Math/MathML" display="block">
      <mi>x</mi> <mo>= </mo> <mo>5</mo>
      <mo>+</mo> <mo>+</mo>
      <mi>x</mi> <mo>= </mo> <mo>-3</mo>
    </math>
  </p>
</body>
</html>

```