Accessible Math Comes to PDF: PDF 2.0 enables fully-accessible STEM content
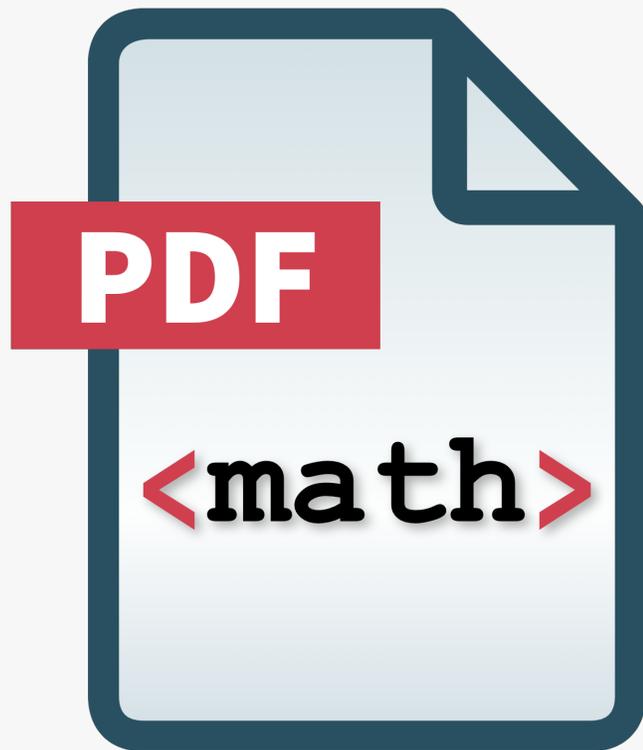
BERLIN, BERLIN, GERMANY, March 4, 2026 /EINPresswire.com/ -- PDFs with accessible mathematics have reached a practical turning point. For the first time, complex equations embedded in PDF documents can be navigated, spoken, and rendered in braille by assistive technology using standards-based MathML. For students, researchers, and professionals in science, technology, engineering, and mathematics (STEM), this closes a longstanding accessibility gap between the web and downloadable documents.

For years, mathematical content on the web has been made accessible through MathML. In contrast, math in PDF files was typically reduced to unstructured alternative text—insufficient for braille math codes and incapable of supporting structured navigation. That limitation effectively excluded many blind and visually impaired users from independently accessing STEM materials distributed in PDF format.

The accessible STEM content toolchain, from authoring software to assistive technology.

With PDF 2.0 and PDF/UA-2 (the 2024 revision of the accessibility standard for PDF), that barrier has been removed. Mathematical expressions can now be embedded as MathML within PDF files using ISO-standardized mechanisms. When combined with compatible readers and assistive technologies, equations are delivered as semantically rich content rather than inaccessible images or textual approximations.

The change is the result of four necessary technologies aligning, as is now demonstrated for NVDA and JAWS users on Windows:

- Creation software capable of embedding MathML in PDF documents
- Modern PDF files using PDF 2.0 features
- PDF viewers that process MathML content
- Assistive technologies that interpret MathML within PDF

Authoring tools have begun to adopt this workflow. Recent releases of LaTeX, the open-source typesetting system widely used for STEM publishing, can now automatically embed MathML in exported PDFs using ISO-standardized methods. Microsoft Word also exports MathML when generating PDFs, although its implementation is not based on the ISO mechanisms defined in PDF 2.0.

Viewer support is advancing. Foxit Reader and Mozilla Firefox can process PDFs that include MathML via either ISO-standardized approach: structure elements or the Associated Files mechanism. Adobe Reader currently supports the structure elements method, but not the Associated Files method.
Assistive technologies are also evolving. In its 2025 release, NVDA, when paired with a MathML add-in such as MathCAT, demonstrates full navigation and accurate speech output of mathematical expressions embedded in PDF 2.0 documents. The JAWS screen reader, when used with Firefox, is similarly capable of reading accessible math in PDFs.

Early user testing indicates the impact is substantial. Louis Maher, Secretary of the Science and Engineering Division of the National Federation of the Blind, stated after reviewing LaTeX-generated PDFs: "I could never read a PDF document with math in it—I always needed help to find out some of the content. In my testing, with these new tools, the math in PDF is spoken as correctly as it is in HTML. Your PDF work is very impressive."

The implications extend beyond new documents. Many universities, research institutes, and publishers maintain extensive archives of LaTeX source files corresponding to existing PDF collections. Because accessibility can now be generated automatically during compilation, institutions may soon be able to reprocess large back catalogs into accessible PDF 2.0 files without manual remediation.

The shift also affects accessibility compliance tools. To properly evaluate PDF files containing math, checkers must support PDF 2.0 and PDF/UA-2. Many current tools still test against PDF/UA-1 (2014), which does not recognize newer MathML-based techniques. As a result, valid PDF/UA-2 documents are often incorrectly flagged as non-compliant. We hope that this situation improves soon, and that these tools are rapidly updated, as users should not be forced to produce less accessible documents simply to obtain a check-mark from validation software.

As of early 2026, PDF Association members including BFO, Dual Lab, PDFix and the LaTeX Project

have announced support for PDF/UA-2 in their accessibility checking solutions. Wider industry adoption is expected as regulatory and procurement standards update to reflect the new specification.

LaTeX's developers have published [demonstrations, examples, and short videos](#) illustrating the difference between legacy math-in-PDF workflows and the new standards-based approach.

After decades in which PDF creation software prioritized visual fidelity over semantic structure, accessible math in PDF is now technically viable and operational in mainstream tools. The remaining challenge is adoption. As creation software, readers, assistive technologies, and validation tools converge on ISO-standardized methods, accessible STEM publishing in PDF can become the default rather than the exception.

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