

An updated survey of OpenType Math Fonts

Ulrik Vieth
Stuttgart, Germany

Bach T_E X 2023
Brodnica, Poland

15 years of OpenType math fonts

- OpenType math font technology
 - 2007: engine support in MS Office
 - 2008: engine support in XeTeX, XeLaTeX
 - 2009: engine support in LuaTeX, LuaLaTeX, ConTeXt
 - 2010: engines + macros + fonts in TeX Live

15 years of OpenType math fonts

- OpenType math font support
 - 2007: Cambria Math
 - 2008: Asana Math, from pxfonts
 - 2010: XITS Math, from STIX 1.0
 - 2013: STIX 1.1, 2016: STIX Two
 - 2011: Latin Modern Math (GUST Team)
 - 2012–2015: T_EX Gyre Math (GUST Team)
 - 2011–2012: Lucida Math (TUG Project)

15 years of OpenType math fonts

- OpenType math font support
 - 2016: Libertinus Math, from Linux Libertine
 - 2018: Garamond Math, from EB Garamond
 - 2019: Erewhon Math, from Utopia
 - 2022: XCharter Math, from Charter
 - 2020: KpFonts Math (Roman + Sans)

 - 2016: GFS Neohellenic Math
 - 2018: Fira Math, from Fira Sans
 - 2020: (Lato Math), unreleased
 - 2023: (Noto Sans Math), incomplete

 - 2019: New Computer Modern Math
 - 2022: Euler Math, from Neo Euler
 - 2022: Concrete Math

Choices of OpenType math fonts

- Choices of OpenType math fonts
 - 20 choices of math fonts
 - 30 individual math fonts (including variants)
- Coverage of traditional T_EX fonts
 - Latin Modern, New Computer Modern
 - Concrete Math, Euler Math
- Coverage of standard PostScript fonts
 - T_EX Gyre (Termes, Pagella, Schola, Bonum)
 - XITS/STIX/STIX Two (Times)
 - KpFonts (Palladio), Asana (pxfonts)
- Coverage of free PostScript fonts
 - Libertinus, Garamond (EB Garamond)
 - Erewhon (Utopia), XCharter (Charter)

Choices of OpenType math fonts

- Choices of sans-serif math
 - GFS Neohellenic
 - Fira
 - (Lato)
 - KpSans
- Choices with multiple weights
 - New CM (Regular, Book)
 - KpRoman (Light, Regular)
- Choices of bold math
 - XITS (Bold)
 - Lucida (Demi)
 - Erewhon (Bold), XCharter (Bold)
 - KpRoman (Semi, Bold), KpSans (Bold)

Samples of OpenType math fonts

- Cambria Math
 - commissioned by Microsoft, by Tiro Typeworks
 - non-free, distributed as system font on Windows

$$\Delta \mathbf{E} - \frac{1}{c^2} \frac{\partial^2 \mathbf{E}}{\partial t^2} = \frac{1}{\epsilon_0} \nabla \lambda + \mu_0 \frac{\partial \mathbf{j}}{\partial t}, \quad \Delta \mathbf{B} - \frac{1}{c^2} \frac{\partial^2 \mathbf{B}}{\partial t^2} = -\mu_0 \operatorname{rot} \mathbf{j}$$

$$i\hbar \frac{\partial \psi}{\partial t} = \frac{1}{2m} \left(\frac{\hbar}{i} \nabla - q\mathbf{A}(\mathbf{r}) \right)^2 \psi + q\phi(\mathbf{r}) \psi$$

$$\gamma^\alpha \left(\frac{\hbar}{i} \partial_\alpha - qA_\alpha \right) \psi + m_0 c \psi = 0$$

$$R^{\mu\nu} - \frac{1}{2} R g^{\mu\nu} + \Lambda g^{\mu\nu} = -\frac{8\pi G}{c^2} M^{\mu\nu}$$

Samples of OpenType math fonts

- STIX Two Math
 - commissioned by STI Pub, revised by Tiro Typeworks

$$\Delta \mathbf{E} - \frac{1}{c^2} \frac{\partial^2 \mathbf{E}}{\partial t^2} = \frac{1}{\epsilon_0} \nabla \lambda + \mu_0 \frac{\partial \mathbf{j}}{\partial t}, \quad \Delta \mathbf{B} - \frac{1}{c^2} \frac{\partial^2 \mathbf{B}}{\partial t^2} = -\mu_0 \operatorname{rot} \mathbf{j}$$

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$$R^{\mu\nu} - \frac{1}{2} R g^{\mu\nu} + \Lambda g^{\mu\nu} = -\frac{8\pi G}{c^2} M^{\mu\nu}$$

Samples of OpenType math fonts

- Lucida Math
 - by Bigelow & Holmes, Khaled Hosny, et al.
 - non-free, sold via TUG web site

$$\Delta E - \frac{1}{c^2} \frac{\partial^2 E}{\partial t^2} = \frac{1}{\epsilon_0} \nabla \lambda + \mu_0 \frac{\partial \mathbf{j}}{\partial t}, \quad \Delta \mathbf{B} - \frac{1}{c^2} \frac{\partial^2 \mathbf{B}}{\partial t^2} = -\mu_0 \operatorname{rot} \mathbf{j}$$

$$i\hbar \frac{\partial \psi}{\partial t} = \frac{1}{2m} \left(\frac{\hbar}{i} \nabla - q\mathbf{A}(\mathbf{r}) \right)^2 \psi + q\phi(\mathbf{r}) \psi$$

$$y^\alpha \left(\frac{\hbar}{i} \partial_\alpha - qA_\alpha \right) \psi + m_0 c \psi = 0$$

$$R^{\mu\nu} - \frac{1}{2} R g^{\mu\nu} + \Lambda g^{\mu\nu} = -\frac{8\pi G}{c^2} M^{\mu\nu}$$

Samples of OpenType math fonts

- Libertinus Math
 - by Khaled Hosny, Caleb Maclennan
 - alphabets from Libertine, sans-serif from Biolinum

$$\Delta \mathbf{E} - \frac{1}{c^2} \frac{\partial^2 \mathbf{E}}{\partial t^2} = \frac{1}{\epsilon_0} \nabla \lambda + \mu_0 \frac{\partial \mathbf{j}}{\partial t}, \quad \Delta \mathbf{B} - \frac{1}{c^2} \frac{\partial^2 \mathbf{B}}{\partial t^2} = -\mu_0 \operatorname{rot} \mathbf{j}$$

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$$\gamma^\alpha \left(\frac{\hbar}{i} \partial_\alpha - qA_\alpha \right) \psi + m_0 c \psi = 0$$

$$R^{\mu\nu} - \frac{1}{2} R g^{\mu\nu} + \Lambda g^{\mu\nu} = -\frac{8\pi G}{c^2} M^{\mu\nu}$$

Samples of OpenType math fonts

- Garamond Math
 - by Yuansheng Zhao, Xiangdong Zeng
 - alphabets from EB Garamond, sans-serif from Libertinus

$$\Delta \mathbf{E} - \frac{1}{c^2} \frac{\partial^2 \mathbf{E}}{\partial t^2} = \frac{1}{\epsilon_0} \nabla \lambda + \mu_0 \frac{\partial \mathbf{j}}{\partial t}, \quad \Delta \mathbf{B} - \frac{1}{c^2} \frac{\partial^2 \mathbf{B}}{\partial t^2} = -\mu_0 \operatorname{rot} \mathbf{j}$$

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$$R^{\mu\nu} - \frac{1}{2} R g^{\mu\nu} + \Lambda g^{\mu\nu} = -\frac{8\pi G}{c^2} M^{\mu\nu}$$

Samples of OpenType math fonts

- Erewhon Math
 - by Daniel Flipo, Michael Sharpe, Michel Bovani
 - alphabets from Utopia, symbols from Fourier-GUT

$$\Delta \mathbf{E} - \frac{1}{c^2} \frac{\partial^2 \mathbf{E}}{\partial t^2} = \frac{1}{\epsilon_0} \nabla \lambda + \mu_0 \frac{\partial \mathbf{j}}{\partial t}, \quad \Delta \mathbf{B} - \frac{1}{c^2} \frac{\partial^2 \mathbf{B}}{\partial t^2} = -\mu_0 \operatorname{rot} \mathbf{j}$$

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$$R^{\mu\nu} - \frac{1}{2} R g^{\mu\nu} + \Lambda g^{\mu\nu} = -\frac{8\pi G}{c^2} M^{\mu\nu}$$

Samples of OpenType math fonts

- XCharter Math
 - by Daniel Flipo, Michael Sharpe, Paul Pichaureau
 - alphabets from Charter, symbols from MathDesign

$$\Delta \mathbf{E} - \frac{1}{c^2} \frac{\partial^2 \mathbf{E}}{\partial t^2} = \frac{1}{\epsilon_0} \nabla \lambda + \mu_0 \frac{\partial \mathbf{j}}{\partial t}, \quad \Delta \mathbf{B} - \frac{1}{c^2} \frac{\partial^2 \mathbf{B}}{\partial t^2} = -\mu_0 \operatorname{rot} \mathbf{j}$$

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$$R^{\mu\nu} - \frac{1}{2} R g^{\mu\nu} + \Lambda g^{\mu\nu} = -\frac{8\pi G}{c^2} M^{\mu\nu}$$

Samples of OpenType math fonts

- KpRoman Math
 - by Daniel Flipo, Christophe Caignaert
 - alphabets from URW Palladio, sans-serif from ??

$$\Delta E - \frac{1}{c^2} \frac{\partial^2 E}{\partial t^2} = \frac{1}{\epsilon_0} \nabla \lambda + \mu_0 \frac{\partial \mathbf{j}}{\partial t}, \quad \Delta \mathbf{B} - \frac{1}{c^2} \frac{\partial^2 \mathbf{B}}{\partial t^2} = -\mu_0 \text{rot } \mathbf{j}$$

$$i\hbar \frac{\partial \psi}{\partial t} = \frac{1}{2m} \left(\frac{\hbar}{i} \nabla - q\mathbf{A}(\mathbf{r}) \right)^2 \psi + q\phi(\mathbf{r}) \psi$$

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$$R^{\mu\nu} - \frac{1}{2} R g^{\mu\nu} + \Lambda g^{\mu\nu} = -\frac{8\pi G}{c^2} M^{\mu\nu}$$

Samples of OpenType math fonts

- KpSans Math
 - by Daniel Flipo, Christophe Caignaert
 - sans-serif from ??

$$\Delta E - \frac{1}{c^2} \frac{\partial^2 E}{\partial t^2} = \frac{1}{\epsilon_0} \nabla \lambda + \mu_0 \frac{\partial j}{\partial t}, \quad \Delta B - \frac{1}{c^2} \frac{\partial^2 B}{\partial t^2} = -\mu_0 \operatorname{rot} j$$

$$i\hbar \frac{\partial \psi}{\partial t} = \frac{1}{2m} \left(\frac{\hbar}{i} \nabla - qA(r) \right)^2 \psi + q\phi(r) \psi$$

$$\gamma^\alpha \left(\frac{\hbar}{i} \partial_\alpha - qA_\alpha \right) \psi + m_0 c \psi = 0$$

$$R^{\mu\nu} - \frac{1}{2} R g^{\mu\nu} + \Lambda g^{\mu\nu} = -\frac{8\pi G}{c^2} M^{\mu\nu}$$

Samples of OpenType math fonts

- GFS Neohellenic Math
 - by Antonis Tsolomitis, George Matthiopoulos

$$\Delta \mathbf{E} - \frac{1}{c^2} \frac{\partial^2 \mathbf{E}}{\partial t^2} = \frac{1}{\epsilon_0} \nabla \lambda + \mu_0 \frac{\partial \mathbf{j}}{\partial t}, \quad \Delta \mathbf{B} - \frac{1}{c^2} \frac{\partial^2 \mathbf{B}}{\partial t^2} = -\mu_0 \operatorname{rot} \mathbf{j}$$

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$$\gamma^\alpha \left(\frac{\hbar}{i} \partial_\alpha - qA_\alpha \right) \psi + m_0 c \psi = 0$$

$$R^{\mu\nu} - \frac{1}{2} R g^{\mu\nu} + \Lambda g^{\mu\nu} = -\frac{8\pi G}{c^2} M^{\mu\nu}$$

Recent OpenType math fonts

- Fira Math
 - by Xiangdong Zeng
 - alphabets from Fira Sans

$$\Delta \mathbf{E} - \frac{1}{c^2} \frac{\partial^2 \mathbf{E}}{\partial t^2} = \frac{1}{\epsilon_0} \nabla \lambda + \mu_0 \frac{\partial \mathbf{j}}{\partial t}, \quad \Delta \mathbf{B} - \frac{1}{c^2} \frac{\partial^2 \mathbf{B}}{\partial t^2} = -\mu_0 \operatorname{rot} \mathbf{j}$$

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$$R^{\mu\nu} - \frac{1}{2} R g^{\mu\nu} + \Lambda g^{\mu\nu} = -\frac{8\pi G}{c^2} M^{\mu\nu}$$

Recent OpenType math fonts

- Lato Math
 - unreleased version, from Github, symbols from Fira Sans
 - alphabets from Lato (Łukasz Dziejdzic, Adam Twardoch)

$$\Delta \mathbf{E} - \frac{1}{c^2} \frac{\partial^2 \mathbf{E}}{\partial t^2} = \frac{1}{\epsilon_0} \nabla \lambda + \mu_0 \frac{\partial \mathbf{j}}{\partial t}, \quad \Delta \mathbf{B} - \frac{1}{c^2} \frac{\partial^2 \mathbf{B}}{\partial t^2} = -\mu_0 \operatorname{rot} \mathbf{j}$$

$$i\hbar \frac{\partial \psi}{\partial t} = \frac{1}{2m} \left(\frac{\hbar}{i} \nabla - q\mathbf{A}(r) \right)^2 \psi + q\phi(r) \psi$$

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$$R^{\mu\nu} - \frac{1}{2} R g^{\mu\nu} + \Lambda g^{\mu\nu} = -\frac{8\pi G}{c^2} M^{\mu\nu}$$

Samples of OpenType math fonts

- New Computer Modern Math
 - by Antonis Tzolomitis
 - from Latin Modern with extended Unicode coverage

$$\Delta \mathbf{E} - \frac{1}{c^2} \frac{\partial^2 \mathbf{E}}{\partial t^2} = \frac{1}{\epsilon_0} \nabla \lambda + \mu_0 \frac{\partial \mathbf{j}}{\partial t}, \quad \Delta \mathbf{B} - \frac{1}{c^2} \frac{\partial^2 \mathbf{B}}{\partial t^2} = -\mu_0 \operatorname{rot} \mathbf{j}$$

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$$R^{\mu\nu} - \frac{1}{2} R g^{\mu\nu} + \Lambda g^{\mu\nu} = -\frac{8\pi G}{c^2} M^{\mu\nu}$$

Samples of OpenType math fonts

- Concrete Math
 - by Daniel Flipo, from Metafont

$$\Delta \mathbf{E} - \frac{1}{c^2} \frac{\partial^2 \mathbf{E}}{\partial t^2} = \frac{1}{\epsilon_0} \nabla \lambda + \mu_0 \frac{\partial \mathbf{j}}{\partial t}, \quad \Delta \mathbf{B} - \frac{1}{c^2} \frac{\partial^2 \mathbf{B}}{\partial t^2} = -\mu_0 \operatorname{rot} \mathbf{j}$$

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$$R^{\mu\nu} - \frac{1}{2} R g^{\mu\nu} + \Lambda g^{\mu\nu} = -\frac{8\pi G}{c^2} M^{\mu\nu}$$

Samples of OpenType math fonts

- Euler Math
 - by Daniel Flipo, Khaled Hosny

$$\Delta \mathbf{E} - \frac{1}{c^2} \frac{\partial^2 \mathbf{E}}{\partial t^2} = \frac{1}{\epsilon_0} \nabla \lambda + \mu_0 \frac{\partial \mathbf{j}}{\partial t}, \quad \Delta \mathbf{B} - \frac{1}{c^2} \frac{\partial^2 \mathbf{B}}{\partial t^2} = -\mu_0 \operatorname{rot} \mathbf{j}$$

$$i\hbar \frac{\partial \psi}{\partial t} = \frac{1}{2m} \left(\frac{\hbar}{i} \nabla - q\mathbf{A}(\mathbf{r}) \right)^2 \psi + q\phi(\mathbf{r}) \psi$$

$$\gamma^\alpha \left(\frac{\hbar}{i} \partial_\alpha - qA_\alpha \right) \psi + m_0 c \psi = 0$$

$$R^{\mu\nu} - \frac{1}{2} R g^{\mu\nu} + \Lambda g^{\mu\nu} = -\frac{8\pi G}{c^2} M^{\mu\nu}$$

Completeness of math symbols

- Unicode math defines hundreds of math symbols (1270+)
 - big delimiters, big operators, radicals
 - over/under accents, wide over/under accents
 - regular symbols (ordinary, binary, relation)
- OpenType math fonts can choose what to implement
 - some fonts aim for completeness (1150+ symbols)
 - some fonts provide a smaller subset (550+ symbols)
 - any such subset is better than traditional 8-bit T_EX

Completeness of math symbols

- some fonts aim for completeness (1150+ symbols)

New Computer Modern	1271 symbols
STIX Two Math	1256 symbols
XITS Math	1253 symbols
(Lato Math)	1221 symbols
Asana Math	1211 symbols
GFS Neohellenic	1175 symbols
(Noto Math)	1162 symbols
Cambria Math	1159 symbols
Lucida Math	951 symbols

Completeness of math symbols

- some fonts provide smaller subset (550+ symbols)

Garamond Math	608 symbols
Erewhon Math	599 symbols
Euler Math	591 symbols
Kp Math (2x)	589 symbols
XCharter Math	577 symbols
Libertinus Math	560 symbols
T _E X Gyre Math (5x)	556 symbols
Latin Modern Math	554 symbols
Fira Math	508 symbols
Concrete Math	499 symbols

Completeness of math symbols

- some bold fonts provide similar subset (450+ symbols)

XITS Math Bold 499 symbols

Kp Math Bold (2x) 495 symbols

Lucida Math Demi 472 symbols

- some bold fonts provide minimal subset (100+ symbols)

Erewhon Math Bold 114 symbols

XCharter Math Bold 107 symbols

Completeness of math alphabets

- Unicode math defines dozens of math alphabets
 - main alphabet (4x Latin + 4x Greek + 2x numerals)
 - sans-serif (4x Latin + 2x Greek + 2x numerals)
 - Script (2x Latin)
 - Fraktur (2x Latin)
 - BBold (1x Latin + 1x numerals)
 - typewriter (1x Latin + 1x numerals)
- OpenType math fonts can choose what to implement
 - some fonts are missing specific alphabets
 - some fonts also provide extra alphabets

Completeness of math alphabets

- some fonts aim for completeness (1150+ alphabetic)

New Computer Modern	1170 alphabetic
STIX Two Math	1170 alphabetic (+ extra)
XITS Math	1170 alphabetic (+ extra)
Cambria Math	1170 alphabetic
Asana Math	1167 alphabetic
(Noto Math)	1164 alphabetic
T _E X Gyre Math (5x)	1163 alphabetic

Completeness of math alphabets

- some fonts have specific gaps in alphabets

Libertinus Math	1145 alphabetic
Garamond Math	1100 alphabetic (+ extra)
Erewhon Math	1117 alphabetic
Latin Modern Math	1111 alphabetic
XCharter Math	1073 alphabetic
KpRoman Math	1068 alphabetic (+ extra)
Lucida Math	1038 alphabetic (+ extra)

- What is missing?
 - Garamond: bold sans-serif italic lower Greek
 - Erewhon, Latin Modern: lower Script
 - XCharter, KpRoman: lower Script, lower BBold
 - Lucida: lower/bold Script, bold Fraktur, lower BBold

Completeness of math alphabets

- sans-serif fonts usually leave out sans (+ typewriter) slots

KpSans Math	720 alphabetic
Concrete Math	634 alphabetic
GFS Neohellenic	568 alphabetic
(Lato Math)	606 alphabetic
Fira Math	584 alphabetic
Euler Math	480 alphabetic

- What is missing?
 - KpSans: lower Script, lower BBold
 - Concrete: lower/bold Script, lower BBold
 - GFS: lower/bold Script, lower/bold Fraktur, lower BBold
 - Lato, Fira: all Script, all Fraktur
 - Euler: also leavaes out italic slots of main alphabet

Completeness of math alphabets

- some bold fonts only leave out typewriter slots

XITS Math Bold 1093 alphabetic

Erewhon Bold 970 alphabetic

Lucida Math Demi 961 alphabetic

- some bold fonts also leave out sans and bold slots

KpRoman Math Bold 362 alphabetic

KpSans Math Bold 352 alphabetic

XCharter Math Bold 317 alphabetic

- What is missing?
 - Erewhon: lower Script, all BBold
 - Lucida: lower Script, all Fraktur, lower BBold
 - KpFonts: lower/bold script, bold Fraktur, lower BBold
 - XCharter: lower/bold script, bold Fraktur, all BBold

Design issues: Choices of matching fonts

- Unicode math combines multiple alphabets (e.g. Serif, Sans Serif, Script, Fraktur, BBold)
- OpenType math fonts need to choose matching fonts
 - no problem for comprehensive families
 - non-trivial design issue for most families
- Choosing a matching sans-serif font
 - Sans-serif should be clearly distinguishable
 - Sans-serif should not be too incompatible
 - Sans-serif should match weight, width, angle, shapes
- Choosing a matching Script, Fraktur or BBold font
 - Script and Fraktur should match expected style
 - BBold can sometimes be constructed

Choices of Script, Fraktur, BBold Fonts

- Script/Calligraphic fonts
 - most Script/Calligraphic fonts fall into 2 groups
 - some fonts provide both (using stylistc sets)
 - some fonts are missing lowercase Script
- Fraktur fonts
 - most Fraktur fonts are very similar
 - some Fraktur/Blackletter fonts are very unique
- BBold fonts
 - most BBold fonts fall into 2 groups (serif or sans-serif)
 - some BBold fonts look constructed (hollowed out)
 - some fonts are missing lowercase or numerals

Choices of Script/Calligraphic fonts

- some fonts use Calligraphic style

GFS Neohellenic	<i>ABCXYZ</i>
Concrete Math	<i>ABCXYZ</i>
Garamond Math (ss03)	<i>ABCXYZ</i>
KpRoman, KpSans (ss01)	<i>ABCXYZ</i>
XITS Math (ss01)	<i>ABCXYZ</i>
Euler Math	<i>ABCXYZ</i>
Latin Modern Math	<i>ABCXYZ</i>
New Computer Modern	<i>ABCXYZabcdefghijklmnopqrstuvwxyz</i>
STIX Two Math	<i>ABCXYZabcdefghijklmnopqrstuvwxyz</i>
Cambria Math	<i>ABCXYZabcdefghijklmnopqrstuvwxyz</i>
T _E X Gyre DejaVu Math	<i>ABCXYZabcdefghijklmnopqrstuvwxyz</i>
Lucida Math (ss04)	<i>ABCXYZ</i>

Choices of Script/Calligraphic fonts

- some fonts use Formal Script style

Erewhon Math

ABCXYZ

XCharter Math

ABCXYZ

KpRoman, KpSans Math

ABCXYZ

STIX Two Math (ss01)

ABCXYZ

Garamond Math

ABCXYZabcdefghijklmnopqrstuvwxyz

XITS Math

ABCXYZabcdefghijklmnopqrstuvwxyz

Libertinus Math

ABCXYZabcdefghijklmnopqrstuvwxyz

TeX Gyre Termes Math

ABCXYZabcdefghijklmnopqrstuvwxyz

TeX Gyre Schola Math

ABCXYZabcdefghijklmnopqrstuvwxyz

Lucida Math

ABCXYZab^cxyz

- some fonts use very unique style

TeX Gyre Pagella Math

ABCXYZabcdefghijklmnopqrstuvwxyz

Choices of Fraktur/Blackletter fonts

- most fonts use Fraktur style

TeX Gyre Termes Math	A B C X Y Z a b c x y z
Concrete, Euler Math	A B C X Y Z a b c x y z
Erewhon, XCharter Math	A B C X Y Z a b c x y z
TeX Gyre Pagella Math	A B C X Y Z a b c x y z
Latin Modern Math	A B C X Y Z a b c x y z
New Computer Modern	A B C X Y Z a b c x y z
Garamond Math	A B C X Y Z a b c x y z
Cambria Math	A B C X Y Z a b c x y z
Libertinus Math	A B C X Y Z a b c x y z
STIX Two Math	A B C X Y Z a b c x y z
XITS Math	A B C X Y Z a b c x y z
TeX Gyre Schola Math	A B C X Y Z a b c x y z
TeX Gyre DejaVu Math	A B C X Y Z a b c x y z

Choices of Fraktur/Blackletter fonts

- some fonts use Blackletter style

GFS Neohellenic

A B C X Y Z

Lucida Math

A B C X Y Z a b c x y z

KpRoman, KpSans Math

A B C X Y Z a b c x y z

Choices of BBold fonts

- some fonts use sans-serif BBold stlye

GFS Neohellenic

A|BCNOPQRXYZ

Fira Math

ABCNOPQRXYZabc

Latin Modern Math

ABCNOPQRXYZabc012

Euler Math

ABCNOPQRXYZabc012

Erewhon Math

ABCNOPQRXYZabc012

STIX Two Math

ABCNOPQRXYZabc012

XITS Math

ABCNOPQRXYZabc012

Lucida Math

ABCNOPQRXYZ

KpSans Math

ABCNOPQRXYZ

Choices of BBold fonts

- some fonts use serif BBold style

Concrete Math

ABCNOPQRXYZ

New Computer Modern

ABCNOPQRXYZabc012

Cambria Math

ABCNOPQRXYZabc012

Garamond Math

ABCNOPQRXYZabc012

Libertinus Math

ABCNOPQRXYZabc012

TeX Gyre Schola Math

ABCNOPQRXYZabc012

TeX Gyre Termes Math

ABCNOPQRXYZabc012

TeX Gyre Pagella Math

ABCNOPQRXYZabc012

TeX Gyre DejaVu Math

ABCNOPQRXYZabc012

KpRoman Math

ABCNOPQRXYZ

Summary and Conclusions

- Where are we?
 - OpenType math technology established for 15+ years
 - OpenType math fonts provide advantages to users
 - OpenType math fonts pose challenges to developers
- How are we doing?
 - several recent additions or new releases of fonts
 - choices of math fonts have grown to 20+ fonts
 - coverage of symbols and alphabets has improved
 - some fonts are still lacking at technical level
 - some fonts may need another round of revisions
 - most fonts come with specific L^AT_EX packages
 - all fonts can be used with generic packages

Summary and Conclusions

- Is OpenType math ready for use?
 - Completeness depends on what you are using
 - Stability depends on how you are using it
- Font support varies a lot
 - some font projects have frequent releases
 - some font projects take years to next release
 - some system fonts are updated without notice
 - some bugs get fixed eventually, but may take years