

- std dev:

$$\sigma_x = \sqrt{\langle (x - \langle x \rangle)^2 \rangle} = \sqrt{\frac{1}{N-1} \cdot \left( \sum_{i=1}^N x_i^2 - \frac{1}{N} \cdot \left( \sum_{i=1}^N x_i \right)^2 \right)}$$

- std dev 2:

$$\sigma_x = \sqrt{\langle (x - \langle x \rangle)^2 \rangle} = \sqrt{\frac{1}{N-1} \cdot \left( \sum_{i=1}^N x_i^2 - \frac{1}{N} \cdot \left( \sum_{i=1}^N x_i \right)^2 \right)}$$

- rotation matrix:

$$\mathbf{M}(\alpha) = \begin{pmatrix} \cos(\alpha) + n_x^2 \cdot (1 - \cos(\alpha)) & n_x \cdot n_y \cdot (1 - \cos(\alpha)) - n_z \cdot \sin(\alpha) & n_x \cdot n_z \cdot (1 - \cos(\alpha)) + n_y \cdot \sin(\alpha) \\ n_x \cdot n_y \cdot (1 - \cos(\alpha)) + n_z \cdot \sin(\alpha) & \cos(\alpha) + n_y^2 \cdot (1 - \cos(\alpha)) & n_y \cdot n_z \cdot (1 - \cos(\alpha)) - n_x \cdot \sin(\alpha) \\ n_z \cdot n_x \cdot (1 - \cos(\alpha)) - n_y \cdot \sin(\alpha) & n_z \cdot n_y \cdot (1 - \cos(\alpha)) + n_x \cdot \sin(\alpha) & \cos(\alpha) + n_z^2 \cdot (1 - \cos(\alpha)) \end{pmatrix}$$

- like in label at bottom (no MM):

$$\left( \left[ \sqrt{2\pi \cdot \int_{-\infty}^{\infty} f(x) dx} \right] \right)$$

- like in label at bottom (MM):

$$\left( \left[ \sqrt{2\pi \cdot \int_{-\infty}^{\infty} f(x) dx} \right] \right)$$

- decoration:

$$\vec{x}\vec{X}\vec{\psi} - \dot{x}\dot{X}\dot{\psi} - \ddot{x}\ddot{X}\ddot{\psi} - \overline{x}\overline{X}\overline{\psi} - \underline{x}\underline{X}\underline{\psi} - \hat{x}\hat{X}\hat{\psi} - \tilde{x}\tilde{X}\tilde{\psi} - \underline{\underline{x}}\underline{\underline{X}}\underline{\underline{\psi}} - \overline{\overline{x}}\overline{\overline{X}}\overline{\overline{\psi}} - \bar{x}\bar{X}\bar{\psi} - \vec{x}\vec{X}\vec{\psi}$$

- mathtest:

This is normal text: *thisismath* :  $\langle r^2(\tau) \rangle = \langle (\vec{r}(t) - \vec{r}(t + \tau))^2 \rangle$   $g(\tau) = \frac{1}{N} \cdot \left( 1 + \frac{2}{3} \frac{\langle r^2(\tau) \rangle}{w_{xy}^2} \right)^{-1}$   $\sqcup \sqcap \langle \{ \vec{a} \mid \|\vec{a}\|_2 \geq 2 \} \vec{r}\vec{R}$

$$\frac{\sqrt{\sqrt{\sum_{i=0}^{\infty} i^2 + y^\alpha + 1}}}{\dot{v} \equiv \dot{r}} \arg \min_{\vec{k}} \sum_{\sqrt{i}=0}^N \int_{x_0}^{x_1} (((x))) \underbrace{\left[ \left\{ \frac{\partial f}{\partial x} \right\} \cdot \frac{1}{2} \right]}_{\text{underbraced text}} \hbar \dots \frac{\sqrt{\sum_{i=0}^2 i^2 + y^\alpha}}{\dot{v} \equiv \dot{r}}, \hat{t} \hat{T} \overbrace{\left[ \sqrt{x \cdot Y} \right]}^{\text{overbraced text}} \propto \mathbb{N} \circ \mathbb{Z}$$

$$\langle \vec{x}(\tau) \cdot \vec{R}(t + \bar{\tau}) \rangle \alpha \beta \gamma \delta \epsilon \Gamma \Delta \Theta \Omega \left[ \left[ \sqrt[3]{\hbar \omega} \right] \right]$$

- **chi2 test:**

$$\vec{p}^* = \arg \max_{\vec{p}} \chi^2 = \arg \max_{\vec{p}} \sum_{i=1}^N \left| \frac{\hat{f}_i - f(x_i; \vec{p})}{\sigma_i} \right|^2$$

- **upper/lower parantheses test:**

$$\text{bbblabla} \frac{1}{2} \cdot \left( \frac{1}{e^x + e^{-x}} \right) \cdot \left( \frac{1}{\frac{1+2}{5+x}} \right) \cdot \left( \frac{1}{\exp \left[ -\frac{y^2}{\sqrt{x}} \right] \cdot \exp \left[ -\frac{1}{2} \right]} \right)$$

- **ACF test:**

$$g_{rg}^{ab}(\tau) = \frac{1}{N} \cdot \left( 1 + \frac{2 \langle r^2(\tau) \rangle}{3 w_{xy}^2} \right)^{-1} \cdot \left( 1 + \frac{2 \langle r^2(\tau) \rangle}{3 w_{xy}^2} \right)^{-\frac{1}{2}}$$

- **MSD test:**

$$\text{MSD}(\tau) \equiv \langle r^2(\tau) \rangle = \langle (\vec{r}(t) - \vec{r}(t + \tau))^2 \rangle = 2n \cdot \frac{K_\alpha}{\Gamma(1 + \alpha)} \cdot \tau^\alpha$$

- **math: blackboard:**

ABCDEFGHIJKLMNOPQRSTUVWXYZ#

- **math: bf:**

ABCDEFGHIJKLMNOPQRSTUVWXYZ120

- **math: rm:**

ABCDEFGHIJKLMNOPQRSTUVWXYZ120

- math: cal:

*ABCDEFGHIJKLMNOPQRSTUVWXYZ∞€!*

- subscript test:

$$r_{123} \quad r_{\frac{1}{2}}$$

- subscript0 test:

$$r_{123}$$

- subscript1 test:

$$r_{123}$$

- subscript2 test:

$$r_{123}$$

- subscript3 test:

$$r_{123}r_{\frac{1}{2}}$$

- superscript test:

$$r^{123} \quad r^{\frac{1}{2}}$$

- superscript0 test:

$$r^{123}$$

- superscript1 test:

$$r^{123}$$

- superscript2 test:

$$r^{123}$$

- superscript3 test:

$$r^{123}r^{\frac{1}{2}}$$

- **asuperscript test:**

$$a^{123} a^{\frac{1}{2}}$$

- **asuperscript0 test:**

$$a^{123}$$

- **gsuperscript1 test:**

$$g^{123}$$

- **gsuperscript2 test:**

$$g^{123}$$

- **gsuperscript3 test:**

$$g^{123} g^{\frac{1}{2}}$$

- **frac test:**

$$\frac{a}{b} + \frac{g}{a} - \frac{a^2}{b^2} \cdot \frac{a^2}{b^{\frac{1}{2}}}$$

- **tfrac test:**

$$\frac{a}{b} + \frac{g}{a} - \frac{a^2}{b^2} \cdot \frac{a^2}{b^{\frac{1}{2}}}$$

- **dfrac test:**

$$\frac{a}{b} + \frac{g}{a} - \frac{a^2}{b^2} \cdot \frac{a^2}{b^{\frac{1}{2}}}$$

- **stackrel test:**

$$\frac{a}{b} + \frac{g}{a} - \frac{a^2}{b^2} \cdot \frac{a^2}{b^{\frac{1}{2}}}$$

- **brace5 test: ( )**

$$(((r^{123}))) - - (((r^{123})))$$

- brace6 test: [ ]

$$[[[r^{123}]]] - - [[r^{123}]]$$

- brace7 test:

$$\{\{\{r^{123}\}\}\} - - \{\{\{r^{123}\}\}\}$$

- brace8 test: — — — —

$$||||r^{123}|||| - - ||||r^{123}||||$$

- brace9 test: — —

$$|||r^{123}||| - - |||r^{123}|||$$

- brace10 test

$$\{(r^{123})\} - - \{(r^{123})\}$$

- brace11 test: floor

$$[[[r^{123}]]] - - [[r^{123}]]$$

- brace12 test: ceil

$$[[[r^{123}]]] - - [[r^{123}]]$$

- sub-, superscript test

$$r_{321}^{1234} r_{321}^{1234} - - r_{321}^{1234} r_{321}^{1234} - - \kappa^2 - - \kappa_2 - - \kappa_2^2$$

- super-, subscript test

$$r_{4321}^{123} r_{4321}^{123} - - r_{4321}^{123} r_{4321}^{123} - - \kappa^2 - - \kappa_2 - - \kappa_2^2$$

- math 1:

$$f(x) = \int_{-\infty}^x e^{-t^2} dt$$

- math 2:

$$\sum_{i=1}^{\infty} \frac{-e^{i\pi}}{2^n}$$

- math 3:

$$\det \begin{pmatrix} 1 & x_1 & \dots & x_1^{n-1} \\ 1 & x_2 & \dots & x_2^{n-1} \\ \vdots & \vdots & \ddots & \vdots \\ 1 & x_n & \dots & x_n^{n-1} \end{pmatrix} = \prod_{1 \leq i < j \leq n} (x_j - x_i)$$

- math 4:

$$\sqrt{1 + \sqrt{1 + \sqrt{1 + \sqrt{1 + \sqrt{1 + \sqrt{1 + x}}}}}}}$$

- math 5:

$$\binom{p}{2} = x^2 y^{p-2} - \frac{1}{1-x} \frac{1}{1-x^2}$$

- math 6:

$$a_0 + \frac{1}{a_1 + \frac{1}{a_2 + \frac{1}{a_3 + \frac{1}{a_4}}}}$$

- math 7:

$$\left( \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} \right) |\varphi(x + iy)|^2 = 0$$

- math 8:

$$2^{2^{2^x}}$$

- math 9:

$$\iint_D f(x, y) \, dx \, dy$$

- math 10 (overbrace):

$$\overbrace{x + x + \dots + x}^k \text{ k times}$$

- math 11 (underbrace):

$$\underbrace{x + x + \dots + x}_{k \text{ times}}$$

- math 12 (under/overbrace):

$$\underbrace{\overbrace{x + x + \dots + x}_{k \text{ times}} \overbrace{x + x + \dots + x}_{k \text{ times}}}_{2k \text{ times}}$$

- math 13:

$$y_1'' \quad y_2'''$$

- math 14:

$$f(x) = \begin{cases} 1/3 & \text{if } 0 \leq x \leq 1 \\ 2/3 & \text{if } 3 \leq x \leq 4 \\ 0 & \text{elsewhere} \end{cases}$$

- math 15:

$$\Re z = \frac{n\pi \frac{\theta + \psi}{2}}{\left(\frac{\theta + \psi}{2}\right)^2 + \left(\frac{1}{2} \log \left| \frac{B}{A} \right| \right)^2}$$

- math 16:

$$\sum_{m=1}^{\infty} \sum_{n=1}^{\infty} \frac{m^2 n}{3^m (m 3^n + n 3^m)}$$

- math 17:

$$\phi_n(\kappa) = \frac{1}{4\pi^2 \kappa^2} \int_0^{\infty} \frac{\sin(\kappa R)}{\kappa R} \frac{\partial}{\partial R} \left[ R^2 \frac{\partial D_n(R)}{\partial R} \right] dR$$

- math 18:

$${}_pF_q(a_1, \dots, a_p; c_1, \dots, c_q; z) = \sum_{n=0}^{\infty} \frac{(a_1)_n \cdots (a_p)_n z^n}{(c_1)_n \cdots (c_q)_n n!}$$

- **math 19 (overset):**

$$X \overset{=}{\text{def}} Y \quad X \overset{=}{!} Y \quad X \overset{\rightarrow}{f} Y \quad \frac{f(x + \Delta x) - f(x)}{\Delta x} \Delta x \overset{\rightarrow}{\rightarrow} 0 f'(x)$$

- **math 20 (underset):**

$$X \underset{=}{\text{def}} (5) Y \quad X \underset{\rightarrow}{f} Y \quad \frac{f(x + \Delta x) - f(x)}{\Delta x} \Delta x \underset{\rightarrow}{\rightarrow} 0 f'(x)$$

- **axiom of power test:**

$$\forall A \exists P \forall B [B \in P \iff \forall C (C \in B \Rightarrow C \in A)]$$

- **De Morgan's law:**  $\neg(P \wedge Q) \iff (\neg P) \vee (\neg Q)$  or  $\overline{\bigcap_{i \in I} A_i} \equiv \bigcup_{i \in I} \overline{A_i}$  or  $\overline{A \cup B} \equiv \overline{A} \cap \overline{B}$

- **quadratic formula:**

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- **combination:**

$$\binom{n}{k} = \frac{n(n-1)\dots(n-k+1)}{k(k-1)\dots 1} = \frac{n!}{k!(n-k)!}$$

- **Sophomore's dream 1:**

$$\int_0^1 x^{-x} dx = \sum_{n=1}^{\infty} n^{-n} (=1.29128599706266354040728259059560054149861936827\dots)$$

- **Sophomore's dream 2:**

$$\int_0^1 x^x dx = \sum_{n=1}^{\infty} (-1)^{n+1} n^{-n} = - \sum_{n=1}^{\infty} (-n)^{-n} (=0.78343051071213440705926438652697546940768199014\dots)$$

- **divergence 1:**

$$\text{div } \vec{F} = \nabla \cdot \vec{F} = \frac{\partial U}{\partial x} + \frac{\partial V}{\partial y} + \frac{\partial W}{\partial z}$$



- divergence 2:

$$\vec{\text{div}}(\underline{\epsilon}) = \begin{bmatrix} \frac{\partial \epsilon_{xx}}{\partial x} + \frac{\partial \epsilon_{yx}}{\partial y} + \frac{\partial \epsilon_{zx}}{\partial z} \\ \frac{\partial \epsilon_{xy}}{\partial x} + \frac{\partial \epsilon_{yy}}{\partial y} + \frac{\partial \epsilon_{zy}}{\partial z} \\ \frac{\partial \epsilon_{xz}}{\partial x} + \frac{\partial \epsilon_{yz}}{\partial y} + \frac{\partial \epsilon_{zz}}{\partial z} \end{bmatrix}$$

- lim, sum ...:

$$\lim_{x \rightarrow \infty} f(x) = \binom{k}{r} + \frac{a}{b} \sum_{n=1}^{\infty} a_n + \left\{ \frac{1}{13} \sum_{n=1}^{\infty} b_n \right\}.$$

- Schwinger-Dyson:

$$\langle \psi | \mathcal{T}\{F\phi^j\} | \psi \rangle = \langle \psi | \mathcal{T}\{iF_{,i}D^{ij} - FS_{int,i}D^{ij}\} | \psi \rangle.$$

- Schrödinger's equation:

$$\left[ -\frac{\hbar^2}{2m} \frac{\partial^2}{\partial x^2} + V \right] \Psi(x) = i\hbar \frac{\partial}{\partial t} \Psi(x)$$

- Cauchy-Schwarz inequality:

$$\left( \sum_{k=1}^n a_k b_k \right)^2 \leq \left( \sum_{k=1}^n a_k^2 \right) \left( \sum_{k=1}^n b_k^2 \right)$$

- Maxwell's equations:

$$\begin{aligned} \nabla \times \vec{\mathbf{B}} - \frac{1}{c} \frac{\partial \vec{\mathbf{E}}}{\partial t} &= \frac{4\pi}{c} \vec{\mathbf{j}} \\ \nabla \cdot \vec{\mathbf{E}} &= 4\pi\rho \\ \nabla \times \vec{\mathbf{E}} + \frac{1}{c} \frac{\partial \vec{\mathbf{B}}}{\partial t} &= \vec{\mathbf{0}} \\ \nabla \cdot \vec{\mathbf{B}} &= 0 \end{aligned}$$

- math: radicals:

$$Hxq\sqrt{a}\sqrt{5}\sqrt{-1}\sqrt{h}\sqrt{j}A\sqrt{\bar{A}}\sqrt{\frac{1}{a}\frac{\sqrt{a}}{\sqrt{a}}}\sqrt{\frac{1}{1+\frac{1}{a}}\frac{1}{\sqrt{1+\frac{1}{a}}}}\sqrt{a+\sqrt{a+b}}$$

- **math: non-2 radicals:**

$$Hxq \sqrt[3]{a} \sqrt[3]{5} \sqrt[3]{-1} \sqrt[3]{h} \sqrt[3]{A} \sqrt[3]{\frac{1}{a} \frac{\sqrt[3]{a}}{\sqrt[3]{a}}} \sqrt[3]{\frac{1}{1 + \frac{1}{a}} \frac{1}{\sqrt[3]{1 + \frac{1}{a}}}} \sqrt[3]{a + \sqrt[3]{a + b}}$$

- **math: long non-2 radicals:**

$$Hxq \sqrt[3.14156]{a} \sqrt[3.14156]{5}$$

- **math: sum, prod, ...: no-limits:**

$$Hxq \prod_{i=1}^n \sum_{j=1}^c (i + j) \cdot \frac{1}{2}$$

- limits:

$$Hxq \prod_{i=1}^n \sum_{j=1}^c (i + j) \cdot \frac{1}{2}$$

- long-below:

$$\sum_{n=\{a,b,c,d,e,f,g\}} f(x)$$

- long-above:

$$\sum_{n=\{a,b,c,d,e,f,g\}} f(x)$$

- **math: more sum-symbols :**

$$Hxq \sum_{i=0}^N \prod_{i=0}^N \prod_{i=0}^N \cup_{i=0}^N \cap_{i=0}^N \sqcup_{i=0}^N \vee_{i=0}^N \wedge_{i=0}^N \oplus_{i=0}^N \otimes_{i=0}^N \odot_{i=0}^N \oplus_{i=0}^N$$

- **math: integrals: no-limits:**

$$Hxq \int_0^1 f(x) dx \iint_0^1 f(x) dx \iiint_0^1 f(x) dx \oint_0^1 f(x) dx \int_x f(x) dx$$

– limits:

$$\int_0^1 f(x) \, dx \quad \iint_0^1 f(x) \, dx \quad \iiint_0^1 f(x) \, dx \quad \oint_0^1 f(x) \, dx \quad \int_x f(x) \, dx$$

• **math: frac test:**

$$\frac{a}{b} + \frac{g}{a} - \frac{a^2}{b^2} \cdot \frac{a^2}{b^{\frac{1}{2}}}$$

• **sfrac:**  $Hxq^{\frac{1}{2}}$  –  $Hxq^{\frac{1}{2}}$   $\frac{1}{2}$   $\frac{1}{2+\frac{1}{2}}$   $\frac{1}{2} + \frac{1}{2}$   $\frac{1}{2} + \frac{1}{2}$   $\frac{1}{2+\frac{1}{2}}$   $e^{1/2}$

• **brace+sub/superscript:**  $\langle r_{123} \rangle$   $\langle r^{123} \rangle$   $\langle r_{123} \rangle$