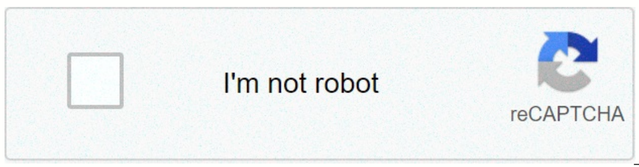

Continue

System of equations latex numbering

The TeX input processing in MathJax can be configured to add formula numbers to displayed equations automatically. This functionality is disabled by default, but it is easy to configure MathJax to produce automatic formula numbers by adding: the window. MathJax = { tex: { tags: 'ams' } }; to tell the TeX input processor to use the AMS numbering rules (where only certain environments produce numbered equations, as they would be in LaTeX). It is also possible to set the marking to everyone, so that each displayed equation gets a number, regardless of the environment used. You can use otag or onumber to prevent individual formulas from being numbered, and \tag{} can be used to override the regular formula number with your own symbol instead (or add a formula code even when automatic numbering is off). Note that the AMS environments come in two forms: star-marked and unstarred. The ustarred versions produce equation numbers (when codes are set to 'ams') and they are not starred. For example, \begin{equation} E = mc^2 \end{equation} is numbered, while \begin{equation*} e^{\pi i} + 1 = 0 \end{equation*} is not numbered (when the codes are 'ams'). You can use \label to provide a formula with an identifier that you can use to reference it later, and then use \ref or \eqref in the document to insert the actual formula number of that location as a reference. For example, in formula \eqref{eq:sample}, we find the value of an interesting integrated: \begin{equation} \int_0^\infty \frac{x^3}{e^x-1}\,dx =\frac{\pi^4}{15} \label{eq:sample} \end{equation} contains a selected formula and a reference to this equation. Please note that references may come before the corresponding formula as well as after them. You can configure how the numbers are displayed and how their references are displayed by including the code format extension and setting options in the tex configuration tag format block. See the tag format extension for more information. If you use automatic formula numbering and change the page dynamically, you may experience problems due to duplicate labels. For how to fix this, see Reset automatic formula numbering. Information and discussion about LaTeX mathematical and science-related functions (e.g. formulas, graphs). ppcombes Post: 1 New: Ons 13 Feb 2013 5:26 pm Postby ppcombes » Thu Feb 13, 2013 5:36 pm Hi, I want to add a single left brace over the two lines of the following system, while keeping the separate numbering of each line, but I haven't managed yet.\begin{eqnarray}&\log w_{i} = C_{i}\, a_{1}+ F_{j(i)}\ , a_{2}+L_{c(i)s(j(i))}\, a_{3}+\delta_{c(i)}+\varepsilon_{i}\label{eq:step1}\\[1ex]&\delta_{c} = U_{c}\, \alpha +u_{c}\label{eq:step2}\end{eqnarray}Thank you for your help. Last edited by localghost on Wed 13 February 2013 5:45 pm, edited 1 time in total. Cause: must be marked as such to keep a post clear legible (see the rules of the board). Tags: localghost Site Moderator Posts: 9204 New: Fri Feb 02, 2007 12:06 pm Postby localghost » Wes February 13, 2013 6:34 pm Avoid eqnarray! The Amsmath package (perhaps enhanced by mathtools) provides much better mathematical environments. In this case, you can use empheq (see below code).\documentclass[11pt]{article}\usepackage[T1]{fontenc}\usepackage{empheq} % loads mathtools, which in turn loads amsmath«\begin{document} \begin{empheq}[left=\empheqlbrace]{align}} \log w_i &= C_i\, a_1+F_{j(i)}\, a_2+L_{c(i)s(j(i))}\, a_3+\delta_{c(i)}+\varepsilon_i \label{eq:step1} \\ \delta_c &= U_c\ , \alpha+u_c\label{eq:step2} \end{empheq}\end{document}As an option, the numcases environment is from the cases. A look at the corresponding manuals is recommended to understand what they are doing. Regards and welcome to the boardThorsten Jump to users browsing this forum: No registered users and 2 guests Page 2 Information and discussion about LaTeX mathematical and science-related features (e.g. formulas, graphs). 2 Responses to 450 Views Last Post by Bartman Show last post on Sat 26 December 2020 20:53 1 Reply 107 Views Last Post by Stefan Kottwitz Show last post on December 23rd, 2020 8:16 1 Reply 130 Views Last Post by kaiserkarl13 Show last post Fri, 18 December 2020 19:36 1 Reply 194 Views Last Post by Ijon Tichy Show last post fri 04 December 04 , 2020 18:53 1 Reply 135 Views Last Post by rais Show Last Post sun, November 29, 2020 18:20 1 Reply 172 Views Last Post by aerodinamika Show Last Post sun, November 22, 2020 2:03 2 Reply 284 Views Last Post by samwell187 Show last post Fri, 13 November 2020 1:27 1 Reply 231 Views Last Post by HenriqueJH99 See Last Post on November 1, 2004 , 2020 4:27 0 Reply 306 Views Last Post by WyoTeacher Show last post Th 15, 2020 17:21 0 Reply 357 Views Last Post by Ijon Tichy Show last post On Tue September 29, 2020 08:38 2 Reply 635 Views Last Post by newbeamer Show last post on Sep 09, 2020 12:20 am Reply 273 Views Last Post by user49915 Show last post On Sep 08 , 2020 19:38 2 Responses 472 Views Last Post by akshay_ka Show last post on Sep 02, 2020 20:18 2 Reply 581 Views Last Post by Kareem Show Last Post on Fri, August 14, 2020 19:19 2 Responses 287 Views Last Post by rgaelzer Show Last Post tue, 11 August 2020 19:01 0 Reply 221 Views Last Post by user22741 Show last post on August 09, 209 , 2020 7:51 1 Reply 245 Views Last Post by JBClaypool Show last post on Sat 01 August 2020 1:15 2 Reply 442 Views Last Post by Bartman Show last post on July 29, 2020 2:15 4 Reply 3002 Views Last Post by Ijon Tichy Show Last Post on Sat, 11 Jul 2020 12:04 am 724 Views Last Post by Achava Show last post on June 3rd, 2020 10:37 pm Reply 210 Views Last Post by Ijon Tichy Show the last last Tiss 03 Jun 2020 11:03 0 Reply 376 Views Last Post by nazikbashimova See last post Sun, May 24, 2020 11:51 am 3 Responses 443 Views Last Post by Bartman See Last Post Sun, May 10, 2020 12:28 1 Reply 614 Views Last Post by WyoTeacher Show last post on April 22nd, 2020 07:41 am 3 Reply 1231 Views Last Post by tpa77l3 View Last Post on April 15, 2015 , 2020 05:23 Go to users browsing this forum: No registered users and 3 guests You can not post new topics in this forumYou can not reply to topics in this forumYou can not edit your posts in this forumYou can not delete your posts in this forumYou can not post attachments in this forum Page 3 Information and discussion about LaTeX mathematical and science-related features (eg. formulas , graphs). 2 Responses to 450 Views Last Post by Bartman Show last post on Sat 26 December 2020 20:53 1 Reply 107 Views Last Post by Stefan Kottwitz Show last post on December 23rd, 2020 8:16 1 Reply 130 Views Last Post by kaiserkarl13 Show last post Fri, 18 December 2020 19:36 1 Reply 194 Views Last Post by Ijon Tichy Show last post fri 04 December 04 , 2020 18:53 1 Reply 135 Views Last Post by rais Show Last Post sun, November 29, 2020 18:20 1 Reply 172 Views Last Post by aerodinamika Show Last Post sun, November 22, 2020 2:03 2 Reply 284 Views Last Post by samwell187 Show last post Fri, 13 November 2020 1:27 1 Reply 231 Views Last Post by HenriqueJH99 See Last Post on November 1, 2004 , 2020 4:27 0 Reply 306 Views Last Post by WyoTeacher Show last post Th 15, 2020 17:21 0 Reply 357 Views Last Post by Ijon Tichy Show last post On Tue September 29, 2020 08:38 2 Reply 635 Views Last Post by newbeamer Show last post on Sep 09, 2020 12:20 am Reply 273 Views Last Post by user49915 Show last post On Sep 08 , 2020 19:38 2 Responses 472 Views Last Post by akshay_ka Show last post on Sep 02, 2020 20:18 2 Reply 581 Views Last Post by Kareem Show Last Post on Fri, August 14, 2020 19:19 2 Responses 287 Views Last Post by rgaelzer Show Last Post tue, 11 August 2020 19:01 0 Reply 221 Views Last Post by user22741 Show last post on August 09, 209 , 2020 7:51 1 Reply 245 Views Last Post by JBClaypool Show last post on Sat 01 August 2020 1:15 2 Reply 442 Views Last Post by Bartman Show last post on July 29, 2020 2:15 4 Reply 3002 Views Last Post by Ijon Tichy Show Last Post on Jul 11, 2020 12:04 pm 4 Responses 724 Views Last Post by Achava Show last post on June 3, 2015 10:37 AM 4 Replies 724 Views Last Post by Achava Show last post on June 3, 2015 , 2020 10:37 1 Reply 210 Views Last Post by Ijon Tichy Show last post on June 03, 2020 11:03 0 Reply 376 Views Post by nazikbashimova See last post on Sun, May 24, 2020 11:51 3 Reply 443 Views Last Post by Bartman Show Last Post Sun, May 10, 2020 12:28 am 1 Responses 614 Views Last Post by WyoTeacher See Last Post on Wed Wed 22, 2020 07:41 3 Reply 1231 Views Last Post by tpa77l3 Show last post on April 15, 2020 5:23 Go to users browsing this forum: No registered users and 3 guests You can not post new topics in this forumYou can not reply to topics in this forumYou can not edit your posts in this forumYou can not delete your posts in this forumYou can not post attachments in this forum This page outlines some more advanced use of mathematics marking using Latex. In particular, it makes heavy use of the AMS-LaTeX packages provided by the American Mathematical Society. Formula numbering[edit] The formula environment automatically numbers the equation: \begin{equation} f(x)=(x+a)(x+b) \end{equation} $f\left(x\right)=\left(x+a\right)\left(x+b\right)$ $w\,w\,w\left(1\right)$ {\displaystyle {f (f(x)}=(x+a)(x+b){\color {White}ww}(1)\,} You can also use the \label and \ref commands (or \eqref from the amsmath package) to select and reference formulas. For formula number 1, \ref results in 1 {\displaystyle 1\,} and \eqref results in $\left(1\right)$ (1) {\displaystyle (1)\,} : \begin{equation} \label{eq:someequation} 6^2 - 5 = 36-5 = 31 \end{equation} this reference equation \ref{eq:someequation}. $6\ 2-5=36-5=31\left(1\right)$ 6 2 − 5 = 36 − 5 = 31 (1) {\displaystyle 6^{2}-5=36-5=31\qquad (1)} this refers to formula 1. {\displaystyle {\text{this references equation 1.}} \,} \begin{equation} \label{eq:erl} a = bq + r \end{equation} where \eqref{eq:erl} is true if a and b are integer with $b eq c$. $a=b\,q+r\left(1\right)$ a = b q + r (1) {\displaystyle a=bq+r\qquad (1)} where (1) is true if a and b {\displaystyle {\text{where (1) is true if }}a{\text{ and }}b\,} are integer with b ≠ c . {\displaystyle

{\text{are integers with }}beq c.} Additional information is provided in the labels and cross-referencing chapter. If you want the enumeration to follow from the section or subpoint header, you must use the amsmath package or use AMS class documents. Then type umberwithin{equation}{section} in the introduction to get enumeration at the section level or umberwithin{equation}{subsection} to get the enumeration to the subpoint level. \documentclass[12pt]{article} \usepackage{amsmath} umberwithin{equation}{subection} \begin{document} \section{First Section} \sub-paragraph{A subpoint} \begin{equation} L' = {L}{\sqrt{1-\frac{v^2}{c^2}}} \end{equation} \equation{end}L' = L 1 − v 2 c 2 w w (1.1.1) {\displaystyle L'={{L}{\sqrt {1-{\frac {v^{2}}{c^{2}}}}{{sqrt {1.1.1)\,} If the style you follow requires setting dots by scum (as required at least in Polish typography) , the umberwithin{equation}{subection} command in the introduction will cause the formula number in the above example to be rendered as follows: (1.1..1). To remove the duplicate dot, add the following command immediately after umberwithin{equation}{section}: \renewcommand{\theequation}{\thesection\arabic{equation}} For a numbering form that use: \renewcommand{\theequation}{\thesubsection\arabic{equation}} in the introduction to the document. Note: Although it may look like \renewcommand works by itself, it will not reset the tax number with each new section. It must be used in conjunction with manual equation number reset after each new section begins, or with much cleaner umberwithin. Child formula numbering[edit edit] To number child equations in a numbered formula environment, place the part of the document that contains them in a subquations environment: \begin{subequations} \label{eq:Maxwell} Maxwell's equations: \begin{align} B'&=-abla \times E, \label{eq:MaxB} \\ E'&=abla \times B - 4\pi, \label{eq:MaxE} \end{align} \end{subequations} Maxwell's equations : {\displaystyle {\text{Maxwell's equations:}}\,} B ' = − ∇ × E , (1.1 a) E ' = ∇ × B − 4 π j , (1.1 b) {\displaystyle {\begin{aligned} B'&=-abla \times E,&\quad &\mathrm {(1.1a)} \\E'&abla \times B-4\pi j,&\mathrm {(1.1b)} \{end{aligned}}} Refers to child formulas can be done using one of two methods: add a label after the \{begin subequations}} viz command. \label{eq:Maxwell}, which refers to the main equation (1.1 above) , or add a label at the end of each line, before the \\command, which refers to the imitation (1,1a or 1.1b above). As shown, it is possible to add both labels in case both types of references are required. Vertical alignment of displayed mathematics[edit] A problem that often arises with displayed environments (screen mast and equation) is the lack of ability to stretch across multiple lines. Although it is possible to define lines individually, these will not be adjusted. Above and below[edit] The printer set\translate and subset commands[1] printer set symbols above and below. Without AmsTex, the same result of \overlooked can be obtained with \stackrel. This can be especially useful for creating new binary relationships: \[A \overset{!} {=} B; A \stackrel{!} {=} B \] A = ! B ; A = ! B {\displaystyle A{\translate {!} {=}} B;~~A{\stackrel {!} {=}} B\,} or to view the use of L'Hôpitals rule: \[\lim_{x\to 0}{\frac{e^x-1}{2x}} \translate{\left[\frac{0}{0}\right]} {\subset{\underset{\mathrm{H}}{=}} \{0}{0}\right]}{\subset{\mathrm{H}}{=}} \{0}{0}\right]}{\subset{\mathrm{H}}{}}} \{0}{0}\right]}{\subset {\mathrm{H}}{=}} \{0}{0}\right]}{\subset{\mathrm{H}}{}} \lim_ {0}{0}\right]}{\mathrm{H}}{}}} \{0}{0}\right]}{\subset {\mathrm{H}}{=}} \{0}{0}\right]}{\subset{\mathrm{H}}{}} \{x\to 0}{\frac{e^x}{2}={\frac{1}{2}}\] paste x → 0 e x − 1 2 x = H [0 0] paste x → 0 x 2 = 1 2 {\displaystyle \paste _{x\to 0}{\frac {e^{x}-1}{2x}}{\Translate {\left[{\frac {0}{0}}\right]}{\subset {\mathrm {H} }{=}}\paste _{x\to 0}{\frac {e^{x}}{2}}={\frac {1}{2}}} to define a new operator that specifies the equal sign with H and the specified fraction: ewcommand{\Heq}[1]{\overset{\left[#1\right]} {\subset{\mathrm{H}}{=}}} which reduces the above example to : \[\lim_{x\to 1 0}{\frac{e^x-1}{2x}} \Heq{\frac{0}{0}} \lim_{x\to 0}{\frac{e^x}{2}}={\frac{1}{2}}\] \overbrace and \underbrace \underbrace may be more useful. However, they have a different syntax (and can be adjusted with the \vphantom command): \[z = \overbrace{ \underbrace{x}_\text{real} + in \underbrace{y}_\text{imaginary} }^\text{complex} \] z = x ⏟ real + in y ⏟ <5> imaginary ⏞ complex number {\displaystyle z=\overbrace {\underbrace {x} _{\text{real}}+i\underbrace {y} _{\text{imaginary}}} ^{\text{complex number}}} Sometimes the comments are longer than the formula commented on , which can cause distance problems. These can be removed using the \mathclap: \[y = a + f(\underbrace{b x}_{ \ge 0 \text{ after assumption}}) = a + f(\underbrace{b x}_{ \mathclap{\ge 0 \text{ after assumption}}}) \] Alternatively, to use brackets instead of braces, use \underbracket and \overbracket commands: \[z = \overbracket[3pt]{ \underbracket{x}_{\text{real}} + \underbracket[3pt][3pt]{ \underbracket{x}_{\text{real}} + \underbracket[3pt][3pt][\underbracket{x}_{\text{real}} + \underbracket[3pt][3pt]{ \underbracket{x}_{\text{real}} + \underbracket[3pt][3pt][0.5pt][7pt]{iy}_{\text{imaginary}} }^{\text{complex number}} \] The optional arguments specify the rule thickness and bracket, respectively : \underbracket[rule thickness][hakeparente]{argument}_{text below} The \xleftarrow and \xrightarrow[1] commands produce arrows that extend to the length of the text. Once again, the syntax is different: the optional argument (using [and]) specifies subscript, and the required argument (using { and }) indicates superscript (which can be left blank by inserting a blank space). \[A \xleftarrow{\text{this way}} B \xrightarrow[\text{or that way}]{ } C \] A ← in this way B → or thus C {\displaystyle A{\xleftarrow {\text{this way}}}B{\xrightarrow[{\text{or that way}}]{}}\}C\,} For more extercible arrows, you must use the mathtools package: \begin{gather} a \xleftrightarrow[under]{over} b\\ % A \xLeftarrow[under]{over} B\\ % B \xRightarrow[under]{over} C\\ %C \xLeftrightarrow[under]{over} D\\ %D \xhookleftarrow[under]{over} E\\ % E \xhookrightarrow[under]{over} F\\ % F \xmapsto[under]{ over} G\\ \end{gather} and for harpoons: \begin{gather} H \xrightharpoondown[under]{over} I\\ % I \xrightharpoonup[under]{over} J\\ % J \xleftharpoondown[under]{over} K\\ % K \xlef tharpoonup[under]{over} L\\ % L \xrightleftharpoons[under]{over} M\\ % M \xleftrightharpoons[under]{over} N \end{gather} adjust and adjust*[edit] Adjust and adjust* environments, available through the amsmath package, used to arrange equations of multiple lines. As with arrays and tables, \\ specifies a line break, and & used to specify the point at which the lines will be adjusted. The Align* environment is used as the displaymath or formula* environment: \begin{align*} f(x) &= (x+a)(x+b)\&=x^2+ (a+b)x +ab \end{align*} f (x) = (x + a) (x + b) = x 2 + (a + b) x + a b {\displaystyle {\begin{aligned}f(x)&=(x+a)(x+b)\\&x^{2}+(a+b)x+ab\end{aligned}}\,} Note that the alignment environment must not be nested in a formula environment (or similar). Instead, align is a replacement such environments; the contents of an adjustment are placed automatically in mathematical mode. align* suppresses numbering. To force numbering on a specific line, use the \tag{...} command before the line break. is equal, but automatically numbers each line as the equation environment. Individual lines can be referenced by placing a \label{...} before the line break. The command onumber or otag can be used to suppress the number of a given line: \begin{align} f(x) &= x^4 + 7x^3 + 2x^2 onumber \\ &\qquad {} + 10x + 12 \end{align} f (x) = x 4 + 7 x 3 + 2 x 2 + 10 x + 10 x + 10 x + 10 x + 10 x + 12 (3) {\displaystyle {\begin{aligned}f(x)&x^{4}+7x^{3}+2x^{2}\\&qquad {}+10x+12\qquad \qquad (3)\end{aligned}}} Note that we have added some indentation on it second line. We also need to insert the double braces ({}) before the + character, otherwise latex does not create the correct spacing after the + character. The reason for this is that without braces interpret the latex + character as an unary operator, rather than the binary operator as it really is. More complicated adjustments are possible, with multiple &amp is on a single line that specifies multiple formula columns, each of which is aligned. The following example illustrates the adjustment rule for align*: \begin{align*} f(x) &= a x^2+b x +c & g(x) & d x^3 \\ f'(x) &= 2 a x +b & g'(x) &= 3 d x^2 \end{align*} f (x) = x 2 + b x + c g (x) = d x 3 f ' (x) = 2 a x + b g ' (x) = 3 d x 2 {\displaystyle {\begin{aligned}f(x)&&=ax^{2}+bx+c&g(x)&dx^{3}\\f'(x)&&=2ax+b& g'(x)&3dx^{2}\end{aligned}}\ ,} Braces that span multiple lines[edit] If you want a brace to continue across a new line, do the following: \begin{align} f(x) & = \pi \left\{ x^4 + 7x^3 + 2x^2 \right.onumber\\ &\qquad \left. {} + 10x + 12 \right\} \end{align} f (x) = π { x 4 + 7 x 3 + 2 x 2 + 10 x + 12 } (4) {\\ displaystyle {\begin{aligned}f(x)&&=\pi \left\{x^{4} <2>]x <3>+7x^{3}+2x^{2}\right.\\&&\qquad \left.{} +10x+12\right\}\qquad \qquad (4)\end{aligned}}} In this construction, the sizes of the left and right braces are not automatically the same , despite the use of \left\{ and \right\}. This is because each line is typed as a completely separate formula – note the use of \right. and \left. so there is no unpaired \left and \right commands in a line (these are not required if the formula is on one line). You can manually check the size of the braces with the \big, \Big, \bigg, and \Bigg commands. Alternatively, the height of the higher formula can be replicated in the second by using the \vphantom: \begin{align} A & = \left(\int_t XXX \right.onumber\\ &\qquad \left.\vphantom{\int_t} ÅYY \dots \right) \end{align} A = (∫ t X X X Y Y ...) (5) {\displaystyle {\begin{aligned}A&=\left(\int YYY\dots {\biggr)}\qquad \qquad \mathrm {(5)} \end{}}} Using adjusted braces for functions[edit] You can also use \left\{ and to type sets function partially: \[f(x) = \left\{ \begin{array}{lr} x^2 & : x < 0\\ x^3 & : x \ge 0 \end{array} \right. \] f (x) = { x 2 : x < 0 x 3 : x ≥ 0 {\displaystyle f(x)=\left\{{{begin{array}{lr}x^{2}&::x<0\\x^{3}&::x\geq 0\end{array}}\right.} Cases environment[edit] Cases environment[1] allowing writing of piecemeal functions: \[u(x) = \begin{cases} \exp{x} & \text{if } x \geq 0 \≥ <\ 0 1 if x < 0 {\displaystyle u(x)={\begin{cases}\exp {x}&{\text{if }}x\geq 0\\1&{\text{if }}x<0\end{cases}}} LaTeX will then take care of defining and or adjusting the columns. In cases, text style mathematics is used with results such as: a = { ∫ x d x b 2 {\displaystyle a={\begin{cases}\int x\,\mathrm {d} x\\b^{2}\end{cases}}} Display style can be used instead using the dcases environment from mathtools: \[a = \begin{dcases} \int x\, \mathrm{d} x\\ b^2 \end{dcases} \] a = { ∫ x d x b 2 {\displaystyle a={\begin{cases}\displaystyle \int x\ ,\mathrm {d} x\\\displaystyle b^{2}\end{cases}}} Often the second column consists mainly of normal text. To specify it in the common Roman font in the document, the dcases* environment can be used: \[f(x) = \begin{dcases*} x & when x is smooth\\ -x and when x is odd \end{dcases*} \] f (x) = { x is even − x when x is odd {\displaystyle f(x)={\begin{cases}x&{\text{when }}x{\text{ is even}}\-x&{\text{when }}x{\text{ is odd}}\end{cases}}} Other environments[edit] Although alignment and alignment* are the most useful, there are several other environments that may also be of interest: Environmental name Description Notes eqnarray and eqnarray* Similar to alignment and alignment* Not recommended because the distance is inconsistent multline and multline*[1] First line left aligned, last line right aligned equation number aligned vertically with first line and not centered as with other environments collect and collect *[1] Subsequent equations without alignment flalign and flalign *[1] Similar to adjusting , but the left adjusts the first formula column, and the right adjusts the last column alignment and alignat*[1] Takes an argument that indicates the number of columns. Allows control of the horizontal space between formulas This environment takes one argument, number of formula columns: count maximum number & s in a row, add 1 and divide by 2. [1] There are also some environments that do not form a mathematical environment by themselves and can be used as building blocks for more elaborate structures: Mathematical environmental name Description collected[1] Allows collection of equations to be set under each other and assigned a single equation number divided[1] Similar to alignment*, but used in another shielded mathematics environment adjusted[1] Similar to adjusting , to be used in another mathematics environment. [1] Similar to alignat, and also takes an additional argument number of columns of equations to specify. It can stack inside alignat. For example: \begin{equation} \left.\begin{aligned} B'&=-\partial \times E,\\ E'&&=\partial \times B - 4\pi j, \end{aligned} \right\} \qquad \text{Maxwell's equations} \end{equation} B ' = − ∂ × E , E ' = ∂ × B − 4 π j , } Maxwell' s equations (1.1) {\displaystyle \left.{ \begin{}aligned B'&=-\partial \times E,\\E'&&=\partial \times B-4\pi j,\end{aligned}}\right\}\quad {\text{Maxwell}}'{\text{s equations}}\qquad \mathrm {(1.1)} } }\begin {alignat}{2} \sigma_1 &= x + y &\quad \sigma_2 &= \frac{x}{y} \\ \sigma_1= \frac{\partial x + y}{\partial x} & \sigma_2' & = \frac{\partial \frac{x}{y}}{{\partial x} \end{alignat} σ 1 = x + y σ 2 = x y (1) σ 1 ' = ∂ x + y ∂ x σ 2' = ∂ x y ∂ x (2) {\ displaystyle {\begin{aligned}\sigma _{1}&=x+y&&\sigma _{2}&={\frac {x}{y}}&\qquad &\qquad &\sigma _{1}'&{ \frac {\partial x+y} {{_partial x}}&... </{2} a0></a0> (this database)&(2)\end{adjusted}}} \begin{gather*} a_0=\frac{1}{\pi}\int\limits_{\pi}^{\pi}f(x)\,\mathrm{d}x\\[6pt] \begin{split} a_n=\frac {1}{\pi}\int\limits_{\pi}^{\pi}f(x)\cos nx\ <\mathrm{d}x=\\frac{1}{\pi}\int\limits_{-\pi}^{\pi}x^2\cos nx,\limits_{-\pi}^{\pi}x^2\cos nx,\mathrm{d}x \end{split}\\[6pt] \begin{split} b_n=\frac{1}{\pi}\int\limits_{-\pi}}^{\pi}f(x)\its nx\,\mathrm{d}x=\\frac{1}{\pi}\in t\limits_{-\pi}^{\pi}x^2\its nx\,\mathrm{d}x \end{split}\\[6pt][6pt][6pt][6pt]\Indented equations[edit] To indent a formula , enter the fleqn in the document class and then enter a specific value for the variable \mathindent : \documentclass[a4paper,fleqn]{report} \usepackage{amsmath} \setlength{\mathindent}{1cm} \begin{document} oindent Eulers formula is specified below: \begin{equation*} e^{ix} = \cos{x} + in \its{x}. \end{equation*} oindent This is a very important formula. \end{document} Page breaks in mathematical environments[edit] To suggest that LaTeX insert a page break in an amsmath environment, you can use the \displaybreak command before the line break. Just like with \pagebreak, \displaybreak can take an optional argument between 0 and 4 denotes the level of desirability of a page break. While 0 means it is allowed to break here, 4 forces a break. No argument means the same as 4. Alternatively, you can enable automatic page breaks in mathematical environments with \allowdisplaybreaks. It can also have an optional argument that denotes the priority of page breaks in formulas. Similarly, 1 means allow page breaks, but avoid them and 4 means pause whenever you want. You can prohibit a page break after a given line by using *. LaTeX will insert a page break into a long formula if it has additional text added using \intertext{} without multiple commands. Specific usage may look like this: \begin{align*} &\vdots\\ &=12+7 \left(-\frac{1}{4}\left(e^{-4t_1}+e^{4t_1-8}\right) -\frac{1}{4}\left(e^{-4t_1}+e^{4t_1-8}\right) &= 12-\frac{7}{4}\int_0^2 \left(e^{4t_1}+e^{4t_1-8} \right)\,dt_1\\&\vdots%\end{align*} Page breaks before viewing mathematics (of all different forms) are controlled by \prediplayspenalty. The standard 10000 means never break immediately before a screen. Knuth (TeXbook chapter 19) explains this as a writing tradition of not having a shown equation at the beginning of a page. It can be relaxed with sometimes an equation can look best held together preceding text with a higher penalty, such as a single-line paragraph about a single-line equation, especially at the end of a section. Boxed Equations[edit] For a single formula or adjustment building block, with the code outside the box, use \boxed{}: \begin{equation} \boxed{x^2+y^2 = z^2} \end{equation} If you want the entire line or multiple formulas to be boxed, use a mini page in a \fbox{}: \fbox{ \addtolength{\addtolength{\\linewidth}{-2\fboxsep}% \addtolength{\linewidth}{-2\fboxrule}% \begin{minipage}{\linewidth} \begin{equation} x^2+y^2=z^2 \end{equation} \end{minipage} } It is also mathtools \Aboxed{} that can be boxed above adjustment marks: \begin{align*} \Aboxed{ f(x) & = \int h(x)\, dx} \\ & = g(x) \end{align*} Custom operators[edit] Although many common operators are available in LaTeX, you sometimes need to type your own, such as to enter the argmax operator. The \operatorname and \operatorname* [1] commands display custom operators. * version specifies the underlined option below as the \paste operator: \[\operatorname{arg\,max}_a f(a) = \operatorname*{arg\,max}_b f(b) \] a r g m a x a f (a) = a r g m a x b f (b) {\displaystyle \operatorname {arg\,max} _{a}f(a)={\subset {b}{\operatorname {arg\,max} }}f(b)} But if the operator is frequently used, it is preferable to define a new operator that can be used throughout the document. The \DeclareMathOperator and \DeclareMathOperator* commands are specified in the header of the document: \DeclareMathOperator*{\argmax}{arg\,max} This defines a new command that can be referenced in the body: a r g m a x c f (c) {\displaystyle {\subset {c}{\operatorname {arg\,max} }}f(c)} Advanced formatting[edit] Boundaries[edit] There are standards for subscript and superscript placement. For example, limits for the glue operator are usually located under the symbol: \begin{equation} \lim_{a\to \infty} \tfrac{1}{a} \end{equation} pastes a → ∞ 1 a {\displaystyle \paste _lim _a\to \infty }{\tfrac {1}{a}}} to override this behavior, use the olimit operator: \begin{equation} \limolimits_{a\to \infty} \tfrac{1}{a} \end{equation} paste a → ∞ 1 a {\displaystyle \lim olimits _{a\to \infty }{\tfrac {1}{a}}} A running glue in text (inside $...$) will have its boundaries placed on the side, so that additional conducting will not be required. To override this behavior, use the \limits command. On way, you can put the subscript under a symbol that have them on the page: \begin{equation} \int_a^b x^2 \mathrm{d} x \end{equation} ∫ a b x 2 d x {\displaystyle \int _{a}^{b}x^{2}\mathrm {d} x} Limits below and below: \begin{equation} \in t\limits_a^b x^2 \mathrm{d} x \end{equation} ∫ a b x 2 d x {\displaystyle \int \limits _{a}^{b}x^{2}\mathrm {d} x} How to change the default position of summation symbols to the page for each case , add nosumlimits option to the amsmath package. To change the location of integrated symbols, add intlimits to the options. nonamelimits can be used to change the default for named operators like that, min, glue, etc. To produce one-sided boundaries, use \subset as follows: \begin{equation} \lim_{a \subset{>}{\to} \frac{1}{a} \end{equation} pastes a → > 0 1 a {\displaystyle \paste _{a{\subset {>}{\to }}0}{\frac {1}{a}}} Subscript and Superscript[edit edit] You can place symbols in subscript or superscript (in summation style symbols) with olimitter : \begin{equation} \sumolimits' C_n \end{equation} ∑ ′ C n {\displaystyle \sum olimits 'C_{n}} It is impossible to mix them with typical use of such symbols : \begin{equation} \sum_ {n=1}olimits' C_n \end{equation} ∑ n = 1 ' C n {\displaystyle \sum _{n=1}olimitter 'C_{n}} to add both a prime and a limit to a symbol , you can use the \page:\begin{equation} \pageet{}{}\sum_{n=1}C_n \end{equation} ∑ ∑ ' n = 1 C n {\displaystyle \pageet {}{'}\sum _{n=1}C_{n}} It is very flexible : For example, you want to place letters in each corner of the symbol, using this command: \begin{equation} \pageet{_a^b}{_c^d}\sum \end{equation} ∑ a b ∑ c d {\displaystyle \pageet {_{a}^{b}c}^{d}}\sum } To place them in the corners of a arbitrary symbol, you should use \fourIdx from the fouridx package. However, a simple grouping can also solve the problem: \begin{equation} {\sum\limits_{n=1} }'C_n \end{equation} ∑ n = 1 ' C n {\displaystyle {\sum \limits _{n=1}}'C_{n}} since a matteoperator can be used with limits or no limits. To change the state, simply group it. You can make it another mathematical operator if you want, and then you can have limits and then limits again. Subscript with multiple lines[edit] To produce subscript with multiple lines, use the \substack command\begin{equation} \prod_{\substack{ 1\le in \le\\ 1\le j \le m}} M_{i,j} \end{equation} ∏ 1 ≤ ≤ n 1 ≤ j ≤ m M i , j {\displaystyle \prod _{1\leq i\leq n \atop 1\leq j\leq m\ }M_{i ,j}} Text in adjusted math view[edit edit] To add small interjections to mathematical environments, use the \intertext: \begin{minipage}{3in} \begin{align*} \intertext{If} A &amp ;= \sigma_1+\sigma_2\\ B &= \rho_1+\rho_2\\ \intertext{then} C(x) &= e^{Ax^2+\pi}+B \end{minipage} Note that using this command does not change the alignment. In the example above, the \shortintertext{} command from the mathtools package could also have been used instead of to reduce the amount of vertical space laid between the lines. Change font size[edit] There may be a time when you prefer to have some control over the font size. For example, if you use math in text mode, a simple fraction will look like this: a b {\displaystyle \textstyle {\frac {a}{b}}} , while you might prefer to have it displayed larger, for example, when it is in view mode but still keeps it in line, as follows: a b {\displaystyle \displaystyle {\frac {a}{b}}} . A simple approach is to use the predefined sizes for mathematical elements: Size command Description \displaystyle Equation size in display mode \textstyle Equation size in text mode \scriptstyle Size for first sub/superscript font \scriptscriptstyle Size for subsequent sub/superscript font A classic example to see this in use is to insert continued fractions (although it is better to use the \cfrac[1] command described in the math chapter instead of the method below). The following code provides an example. \begin{equation} x = a_0 + \frac{1}{a_1 + \frac{1}{a_2 + \frac{1}{a_3 + a_4}}} \end{equation} x = a 0 + 1 a 1 + 1 a 2 + 1 a 3 + a 4 {\displaystyle x=a_{0}+{\frac {1}{a_{1}+{\frac {1}{a_{2}+{\frac {1}{a_{3}+a_{4}}} As you can see, as the fractions continue, they will be smaller (although they will not be less than in this example, where they have reached the \scriptstyle limit). To keep the size consistent, you can declare each fraction to apply the display style instead. e.g. \begin{equation} x = a_0 + \frac{1}{\displaystyle a_1 + \frac{1}{\displaystyle a_2 + \frac{1}{\displaystyle a_3 + a_4}}} \end{equation} x = a 0 + 1 a 1 + 1 a 2 + 1 a 3 + a 4{\displaystyle x=a_{0}+{\frac {1}{\displaystyle a_{1}+{\frac {1}{\displaystyle a_{2}+{\frac {1}{\displaystyle a_{3}+a_{4}}}}} Another approach is to use the \DeclareMathSizes command to select your preferred sizes. You can define sizes only for \displaystyle, \textstyle, etc. One potential drawback is that this command indicates the global mathematical sizes, as it can only be used in the document introduction. But it is quite easy to use: \DeclareMathSizes{ds}{ts}{ss}{sss}, where ds is the display size, ts is the text size, etc. The values you enter are assumed to be point size (pt). Note that the changes only occur if the value in the first argument matches the current document text size. It is therefore common to see a set of declarations in the introduction, in case the main font changes. E.g. DeclareMathSizes{10}{18}{12}{8}% For size 10 text \DeclareMathSizes{11}{19}{13}{9} % For size 11 text \DeclareMathSizes{12}{20}{14}{10} % For size 12 text Force \display style for all mathematics in a document[edit] Set \everymath{\displaystyle} before forcing all mathematics to Adjusting vertical space around displayed mathematics[edit] There are four parameters that control the vertical space space displayed mathematics: \abovedisplayskip=12pt \belowdisplayskip=12pt \abovedisplayshortskip=0pt \belowdisplayshortskip=7pt Short ships are used if the preceding line ends, horizontally, before the formula. These parameters must be set by . To do: Consider including things from mathtools. ↑ a b c d e f g h i j k l m n Requires amsmath package Earlier: Mathematics Index Next: Theorems Theorems

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