Make amsmath[*] work with lineno

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May 13, 2025

This document demonstrates patches to the amsmath package to work with the lineno package. The code I've used is largely based on the posts here[1] and here[2]; credit is due to their author(s). In addition I've made a few refinements to handle some corner cases.

Demonstration

This section demonstrates that, with this package, line numbers are correctly formatted when using amsmath math environments. lineno is loaded first, and then patches amsmath using `\AddToHook`.

Normal text

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.

`equation`

With line numbers in equations

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi.

$$E = mc^2\,. \tag{1}$$

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante.

Without line numbers in equations

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetuer adipiscing elit.

$$E = mc^2\,. \tag{2}$$

[*] https://ctan.org/pkg/amsmath
[1] https://tex.stackexchange.com/a/461192
[2] https://tex.stackexchange.com/a/443201

Fusce mauris. Vestibulum luctus nibh at lectus. Sed bibendum, nulla a faucibus semper, leo velit ultricies tellus, ac venenatis arcu wisi vel nisl. Vestibulum diam.

`equation*`

With line numbers in equations

Suspendisse vel felis. Ut lorem lorem, interdum eu, tincidunt sit amet, laoreet vitae, arcu. Aenean faucibus pede eu ante. Praesent enim elit, rutrum at, molestie non, nonummy vel, nisl.

$$E = mc^2 \,.$$

Sed commodo posuere pede. Mauris ut est. Ut quis purus. Sed ac odio.

Without line numbers in equations

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Donec odio elit, dictum in, hendrerit sit amet, egestas sed, leo. Praesent feugiat sapien aliquet odio. Integer vitae justo.

$$E = mc^2 \,.$$

Morbi luctus, wisi viverra faucibus pretium, nibh est placerat odio, nec commodo wisi enim eget quam. Quisque libero justo, consectetuer a, feugiat vitae, porttitor eu, libero. Suspendisse sed mauris vitae elit sollicitudin malesuada. Maecenas ultricies eros sit amet ante.

`\[...\]`

With line numbers in equations

Suspendisse vitae elit. Aliquam arcu neque, ornare in, ullamcorper quis, commodo eu, libero. Fusce sagittis erat at erat tristique mollis. Maecenas sapien libero, molestie et, lobortis in, sodales eget, dui.

$$E = mc^2 \,.$$

Sed feugiat. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Ut pellentesque augue sed urna. Vestibulum diam eros, fringilla et, consectetuer eu, nonummy id, sapien.

Without line numbers in equations

Etiam euismod. Fusce facilisis lacinia dui. Suspendisse potenti. In mi erat, cursus id, nonummy sed, ullamcorper eget, sapien.

$$E = mc^2 \,.$$

Aliquam lectus. Vivamus leo. Quisque ornare tellus ullamcorper nulla. Mauris porttitor pharetra tortor.

`multline`

With line numbers in equations

Etiam ac leo a risus tristique nonummy. Donec dignissim tincidunt nulla. Vestibulum rhoncus molestie odio. Sed lobortis, justo et pretium lobortis, mauris turpis condimentum augue, nec ultricies nibh arcu pretium enim.

$$\frac{1}{1+x} = 1 - x + x^2 - x^3 + x^4 - x^5 + x^6 - x^7 + x^8 - x^9 + \mathcal{O}(x^{10}) . \tag{3}$$

Nulla in ipsum. Praesent eros nulla, congue vitae, euismod ut, commodo a, wisi. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Aenean nonummy magna non leo.

$$\begin{multline} \frac{1}{1+x} = 1 - x + x^2 - x^3 + x^4 - x^5 + x^6 - x^7 + x^8 - x^9 \\ + x^{10} - x^{11} + x^{12} - x^{13} + x^{14} - x^{15} + x^{16} - x^{17} + x^{18} - x^{19} + \mathcal{O}(x^{20}) . \tag{4} \end{multline}$$

Nulla mattis luctus nulla. Duis commodo velit at leo. Aliquam vulputate magna et leo. Nam vestibulum ullamcorper leo.

Without line numbers in equations

Curabitur tellus magna, porttitor a, commodo a, commodo in, tortor. Donec interdum. Praesent scelerisque. Maecenas posuere sodales odio.

$$\frac{1}{1+x} = 1 - x + x^2 - x^3 + x^4 - x^5 + x^6 - x^7 + x^8 - x^9 + \mathcal{O}(x^{10}) . \tag{5}$$

Donec et nisl at wisi luctus bibendum. Nam interdum tellus ac libero. Sed sem justo, laoreet vitae, fringilla at, adipiscing ut, nibh. Maecenas non sem quis tortor eleifend fermentum.

$$\begin{multline} \frac{1}{1+x} = 1 - x + x^2 - x^3 + x^4 - x^5 + x^6 - x^7 + x^8 - x^9 \\ + x^{10} - x^{11} + x^{12} - x^{13} + x^{14} - x^{15} + x^{16} - x^{17} + x^{18} - x^{19} + \mathcal{O}(x^{20}) . \tag{6} \end{multline}$$

Nulla non mauris vitae wisi posuere convallis. Sed eu nulla nec eros scelerisque pharetra. Nullam varius. Etiam dignissim elementum metus.

`multline*`

With line numbers in equations

Nulla ac nisl. Nullam urna nulla, ullamcorper in, interdum sit amet, gravida ut, risus. Aenean ac enim. In luctus.

$$\frac{1}{1+x} = 1 - x + x^2 - x^3 + x^4 - x^5 + x^6 - x^7 + x^8 - x^9 + \mathcal{O}(x^{10}) .$$

Etiam pede massa, dapibus vitae, rhoncus in, placerat posuere, odio. Vestibulum luctus commodo lacus. Morbi lacus dui, tempor sed, euismod eget, condimentum at, tortor. Phasellus aliquet odio ac lacus tempor faucibus.

$$\begin{aligned}\frac{1}{1+x} &= 1 - x + x^2 - x^3 + x^4 - x^5 + x^6 - x^7 + x^8 - x^9 \qquad \texttt{[*]} \\ &\quad + x^{10} - x^{11} + x^{12} - x^{13} + x^{14} - x^{15} + x^{16} - x^{17} + x^{18} - x^{19} + \mathcal{O}(x^{20})\,.\end{aligned}$$

Etiam suscipit aliquam arcu. Aliquam sit amet est ac purus bibendum congue. Sed in eros. Morbi non orci.

Without line numbers in equations

Donec et nisl id sapien blandit mattis. Aenean dictum odio sit amet risus. Morbi purus. Nulla a est sit amet purus venenatis iaculis.

$$\frac{1}{1+x} = 1 - x + x^2 - x^3 + x^4 - x^5 + x^6 - x^7 + x^8 - x^9 + \mathcal{O}(x^{10})\,.$$

Maecenas non massa. Vestibulum pharetra nulla at lorem. Duis quis quam id lacus dapibus interdum. Nulla lorem.

$$\begin{aligned}\frac{1}{1+x} &= 1 - x + x^2 - x^3 + x^4 - x^5 + x^6 - x^7 + x^8 - x^9 \\ &\quad + x^{10} - x^{11} + x^{12} - x^{13} + x^{14} - x^{15} + x^{16} - x^{17} + x^{18} - x^{19} + \mathcal{O}(x^{20})\,.\end{aligned}$$

Vivamus eu tellus sed tellus consequat suscipit. Nam orci orci, malesuada id, gravida nec, ultricies vitae, erat. Donec risus turpis, luctus sit amet, interdum quis, porta sed, ipsum. Suspendisse condimentum, tortor at egestas posuere, neque metus tempor orci, et tincidunt urna nunc a purus.

`gather`

With line numbers in equations

Duis aliquet dui in est. Donec eget est. Nunc lectus odio, varius at, fermentum in, accumsan non, enim. Aliquam erat volutpat.

$$E = mc^2\,. \tag{7}$$

Donec vel nibh ut felis consectetuer laoreet. Donec pede. Sed id quam id wisi laoreet suscipit. Nulla lectus dolor, aliquam ac, fringilla eget, mollis ut, orci.

$$E = mc^2\,, \tag{8}$$

$$E^2 = p^2c^2 + m_0^2c^4\,. \tag{9}$$

Donec molestie, magna ut luctus ultrices, tellus arcu nonummy velit, sit amet pulvinar elit justo et mauris. In pede. Maecenas euismod elit eu erat. Aliquam augue wisi, facilisis congue, suscipit in, adipiscing et, ante.

Without line numbers in equations

Cras dapibus, augue quis scelerisque ultricies, felis dolor placerat sem, id porta velit odio eu elit. Aenean interdum nibh sed wisi. Praesent sollicitudin vulputate dui. Praesent iaculis viverra augue.

$$E = mc^2\,. \tag{10}$$

Sed mattis, erat sit amet gravida malesuada, elit augue egestas diam, tempus scelerisque nunc nisl vitae libero. Sed consequat feugiat massa. Nunc porta, eros in eleifend varius, erat leo rutrum dui, non convallis lectus orci ut nibh. Sed lorem massa, nonummy quis, egestas id, condimentum at, nisl.

$$E = mc^2 \,, \tag{11}$$

$$E^2 = p^2c^2 + m_0^2c^4 \,. \tag{12}$$

Sed consequat tellus et tortor. Ut tempor laoreet quam. Nullam id wisi a libero tristique semper. Nullam nisl massa, rutrum ut, egestas semper, mollis id, leo.

`gather*`

With line numbers in equations

Phasellus id magna. Duis malesuada interdum arcu. Integer metus. Morbi pulvinar pellentesque mi.

$$E = mc^2 \,.$$

Sed eleifend, eros sit amet faucibus elementum, urna sapien consectetuer mauris, quis egestas leo justo non risus. Morbi non felis ac libero vulputate fringilla. Mauris libero eros, lacinia non, sodales quis, dapibus porttitor, pede. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos.

$$E = mc^2 \,, \qquad \texttt{[\textbackslash\textbackslash*]}$$
$$E^2 = p^2c^2 + m_0^2c^4 \,.$$

Nullam eleifend justo in nisl. In hac habitasse platea dictumst. Morbi nonummy. Aliquam ut felis.

Without line numbers in equations

Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Aenean nonummy turpis id odio. Integer euismod imperdiet turpis. Ut nec leo nec diam imperdiet lacinia.

$$E = mc^2 \,.$$

Nulla malesuada risus ut urna. Aenean pretium velit sit amet metus. Duis iaculis. In hac habitasse platea dictumst.

$$E = mc^2 \,,$$
$$E^2 = p^2c^2 + m_0^2c^4 \,.$$

Donec tempus neque vitae est. Aenean egestas odio sed risus ullamcorper ullamcorper. Sed in nulla a tortor tincidunt egestas. Nam sapien tortor, elementum sit amet, aliquam in, porttitor faucibus, enim.

`align`

With line numbers in equations

Fusce suscipit cursus sem. Vivamus risus mi, egestas ac, imperdiet varius, faucibus quis, leo. Aenean tincidunt. Donec suscipit.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,. \tag{13}$$

Praesent sed neque id pede mollis rutrum. Vestibulum iaculis risus. Pellentesque lacus. Ut quis nunc sed odio malesuada egestas.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,, \tag{14}$$

$$\nabla \cdot \vec{B} = 0\,, \quad \nabla \times \vec{B} = \frac{1}{c^2}\frac{\partial \vec{E}}{\partial t}\,. \tag{15}$$

Sed gravida lectus ut purus. Morbi laoreet magna. Pellentesque eu wisi. Proin turpis.

Without line numbers in equations

Curabitur ac lorem. Vivamus non justo in dui mattis posuere. Etiam accumsan ligula id pede. Maecenas tincidunt diam nec velit.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,. \tag{16}$$

Quisque consectetuer. In suscipit mauris a dolor pellentesque consectetuer. Mauris convallis neque non erat. In lacinia.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,, \tag{17}$$

$$\nabla \cdot \vec{B} = 0\,, \quad \nabla \times \vec{B} = \frac{1}{c^2}\frac{\partial \vec{E}}{\partial t}\,. \tag{18}$$

Maecenas accumsan dapibus sapien. Duis pretium iaculis arcu. Curabitur ut lacus. Aliquam vulputate.

`align*`

With line numbers in equations

Phasellus fringilla, metus id feugiat consectetuer, lacus wisi ultrices tellus, quis lobortis nibh lorem quis tortor. Donec egestas ornare nulla. Mauris mi tellus, porta faucibus, dictum vel, nonummy in, est. Aliquam erat volutpat.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,.$$

Cras egestas ipsum a nisl. Vivamus varius dolor ut dolor. Fusce vel enim. Pellentesque accumsan ligula et eros.

$$\begin{aligned} \nabla \cdot \vec{E} &= 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,, \qquad \texttt{[\textbackslash\textbackslash*]} \\ \nabla \cdot \vec{B} &= 0\,, \quad \nabla \times \vec{B} = \frac{1}{c^2}\frac{\partial \vec{E}}{\partial t}\,. \end{aligned}$$

In hac habitasse platea dictumst. Proin at est. Curabitur tempus vulputate elit. Pellentesque sem.

Without line numbers in equations

Donec in nisl. Fusce vitae est. Vivamus ante ante, mattis laoreet, posuere eget, congue vel, nunc. Fusce sem.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,.$$

Morbi justo. Aenean nec dolor. In hac habitasse platea dictumst. Proin nonummy porttitor velit.

$$\begin{aligned} \nabla \cdot \vec{E} &= 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,, \\ \nabla \cdot \vec{B} &= 0\,, \quad \nabla \times \vec{B} = \frac{1}{c^2}\frac{\partial \vec{E}}{\partial t}\,. \end{aligned}$$

Vivamus sodales elementum neque. Vivamus dignissim accumsan neque. Sed at enim. Vestibulum nonummy interdum purus.

`alignat`

With line numbers in equations

Quisque facilisis auctor sapien. Pellentesque gravida hendrerit lectus. Mauris rutrum sodales sapien. Fusce hendrerit sem vel lorem.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,. \tag{19}$$

Maecenas dui. Aliquam volutpat auctor lorem. Cras placerat est vitae lectus. Curabitur massa lectus, rutrum euismod, dignissim ut, dapibus a, odio.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,, \tag{20}$$

$$\nabla \cdot \vec{B} = 0\,, \quad \nabla \times \vec{B} = \frac{1}{c^2}\frac{\partial \vec{E}}{\partial t}\,. \tag{21}$$

Donec vitae velit. Suspendisse porta fermentum mauris. Ut vel nunc non mauris pharetra varius. Duis consequat libero quis urna.

Without line numbers in equations

Phasellus placerat vulputate quam. Maecenas at tellus. Pellentesque neque diam, dignissim ac, venenatis vitae, consequat ut, lacus. Nam nibh.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,. \tag{22}$$

Morbi nunc. Aliquam consectetuer varius nulla. Phasellus eros. Cras dapibus porttitor risus.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,, \tag{23}$$

$$\nabla \cdot \vec{B} = 0\,, \quad \nabla \times \vec{B} = \frac{1}{c^2}\frac{\partial \vec{E}}{\partial t}\,. \tag{24}$$

Nunc velit. Nullam elit sapien, eleifend eu, commodo nec, semper sit amet, elit. Nulla lectus risus, condimentum ut, laoreet eget, viverra nec, odio. Proin lobortis.

`alignat*`

With line numbers in equations

Morbi tincidunt posuere arcu. Cras venenatis est vitae dolor. Vivamus scelerisque semper mi. Donec ipsum arcu, consequat scelerisque, viverra id, dictum at, metus.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,.$$

Aenean laoreet aliquam orci. Nunc interdum elementum urna. Quisque erat. Nullam tempor neque.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,, \qquad \texttt{[\textbackslash\textbackslash*]}$$

$$\nabla \cdot \vec{B} = 0\,, \quad \nabla \times \vec{B} = \frac{1}{c^2}\frac{\partial \vec{E}}{\partial t}\,.$$

Aenean scelerisque. Fusce pretium porttitor lorem. In hac habitasse platea dictumst. Nulla sit amet nisl at sapien egestas pretium.

Without line numbers in equations

Ut quis wisi. Praesent quis massa. Vivamus egestas risus eget lacus. Nunc tincidunt, risus quis bibendum facilisis, lorem purus rutrum neque, nec porta tortor urna quis orci.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,.$$

Vivamus commodo eros eleifend dui. Vestibulum in leo eu erat tristique mattis. Cras at elit. Cras pellentesque.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,,$$

$$\nabla \cdot \vec{B} = 0\,, \quad \nabla \times \vec{B} = \frac{1}{c^2}\frac{\partial \vec{E}}{\partial t}\,.$$

Morbi sem. Nulla facilisi. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Nulla facilisi. Morbi sagittis ultrices libero.

`flalign`

With line numbers in equations

Fusce tristique risus id wisi. Integer molestie massa id sem. Vestibulum vel dolor. Pellentesque vel urna vel risus ultricies elementum.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,. \tag{25}$$

Aliquam tortor. Morbi ipsum massa, imperdiet non, consectetuer vel, feugiat vel, lorem. Quisque eget lorem nec elit malesuada vestibulum. Quisque sollicitudin ipsum vel sem.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,, \tag{26}$$

$$\nabla \cdot \vec{B} = 0\,, \quad \nabla \times \vec{B} = \frac{1}{c^2}\frac{\partial \vec{E}}{\partial t}\,. \tag{27}$$

Vivamus sit amet pede. Duis interdum, nunc eget rutrum dignissim, nisl diam luctus leo, et tincidunt velit nisl id tellus. In lorem tellus, aliquet vitae, porta in, aliquet sed, lectus. Phasellus sodales.

Without line numbers in equations

Etiam vel ipsum. Morbi facilisis vestibulum nisl. Praesent cursus laoreet felis. Integer adipiscing pretium orci.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,. \tag{28}$$

Nunc sed pede. Praesent vitae lectus. Praesent neque justo, vehicula eget, interdum id, facilisis et, nibh. Phasellus at purus et libero lacinia dictum.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,, \tag{29}$$

$$\nabla \cdot \vec{B} = 0\,, \quad \nabla \times \vec{B} = \frac{1}{c^2}\frac{\partial \vec{E}}{\partial t}\,. \tag{30}$$

Donec a nibh ut elit vestibulum tristique. Integer at pede. Cras volutpat varius magna. Phasellus eu wisi.

`flalign*`

With line numbers in equations

Integer placerat. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Sed in massa. Class aptent taciti sociosqu ad litora

torquent per conubia nostra, per inceptos hymenaeos.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,.$$

Mauris tempus eros at nulla. Sed quis dui dignissim mauris pretium tincidunt. Mauris ac purus. Phasellus ac libero.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,, \qquad \texttt{[\textbackslash\textbackslash*]}$$
$$\nabla \cdot \vec{B} = 0\,, \quad \nabla \times \vec{B} = \frac{1}{c^2}\frac{\partial \vec{E}}{\partial t}\,.$$

Ut auctor, augue porta dignissim vestibulum, arcu diam lobortis velit, vel scelerisque risus augue sagittis risus. Maecenas eu justo. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris congue ligula eget tortor.

Without line numbers in equations

Aenean tincidunt laoreet dui. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Integer ipsum lectus, fermentum ac, malesuada in, eleifend ut, lorem. Vivamus ipsum turpis, elementum vel, hendrerit ut, semper at, metus. Vivamus sapien tortor, eleifend id, dapibus in, egestas et, pede.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,.$$

Praesent facilisis, augue a adipiscing venenatis, libero risus molestie odio, pulvinar consectetuer felis erat ac mauris. Nam vestibulum rhoncus quam. Sed velit urna, pharetra eu, eleifend eu, viverra at, wisi. Maecenas ultrices nibh at turpis.

$$\nabla \cdot \vec{E} = 0\,, \quad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\,,$$
$$\nabla \cdot \vec{B} = 0\,, \quad \nabla \times \vec{B} = \frac{1}{c^2}\frac{\partial \vec{E}}{\partial t}\,.$$

Integer vel enim sed turpis adipiscing bibendum. Vestibulum pede dolor, laoreet nec, posuere in, nonummy in, sem. Donec imperdiet sapien placerat erat. Donec viverra.

Long equation with \allowdisplaybreaks

Aenean velit sem, viverra eu, tempus id, rutrum id, mi. Nullam nec nibh. Proin ullamcorper, dolor in cursus tristique, eros augue tempor nibh, at gravida diam wisi at purus. Donec mattis ullamcorper tellus.

$$(31) \quad 0, 1, 2,$$
$$3,$$
$$4, 5,$$
$$6, 7,$$

$$8, 9, 10, 11,$$
$$12, 13,$$
$$14, 15, 16, 17,$$
$$18, 19,$$
$$20, 21, 22, 23,$$
$$24, 25, 26, 27, 28, 29,$$
$$30, 31,$$
$$32, 33, 34, 35, 36, 37,$$
$$38, 39, 40, 41,$$
$$42, 43,$$
$$44, 45, 46, 47,$$
$$48, 49, 50, 51, 52, 53,$$
$$54, 55, 56, 57, 58, 59,$$
$$60, 61,$$
$$62, 63, 64, 65, 66, 67,$$
$$68, 69, 70, 71,$$
$$72, 73,$$
$$74, 75, 76, 77, 78, 79,$$
$$80, 81, 82, 83,$$
$$84, 85, 86, 87, 88, 89,$$
$$90, 91, 92, 93, 94, 95, 96, 97,$$
$$98, 99, 100, 101,$$
$$102, 103,$$
$$104, 105, 106, 107,$$
$$108, 109,$$
$$110, 111, 112, 113,$$
$$114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127,$$
$$128, 129, 130, 131,$$
$$132, 133, 134, 135, 136, 137,$$
$$138, 139,$$
$$140, 141, 142, 143, 144, 145, 146, 147, 148, 149,$$
$$150, 151,$$
$$152, 153, 154, 155, 156, 157,$$
$$158, 159, 160, 161, 162, 163,$$
$$164, 165, 166, 167,$$
$$168, 169, 170, 171, 172, 173,$$
$$174, 175, 176, 177, 178, 179,$$
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\end{gathered}
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\end{gathered}
$$

Pellentesque interdum sapien sed nulla. Proin tincidunt. Aliquam volutpat est vel massa. Sed dolor lacus, imperdiet non, ornare non, commodo eu, neque.