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The Fast Fourier Transform is used everywhere but it has a fascinating origin story that could have ended the nuclear arms race. This video is sponsored by 80,000 Hours. Head to http://80000hours.org/veritasium to sign up for their newsletter and get sent a free copy of their in-depth career guide.

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Written by Derek Muller & Felicity Nelson Filmed by Derek Muller & Raquel Nuno Animation by Ivy Tello, Jakub Misiek, Alex Drakoulis, and Fabio Albertelli Edited by Albert Leung & Derek Muller Research Assistant: Katie Barnshaw

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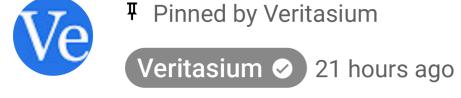
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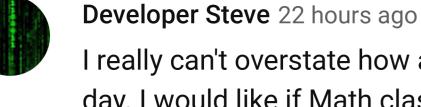
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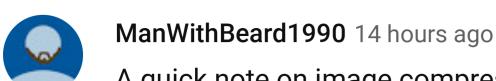
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I really can't overstate how appreciative I am of these science history videos. It's easy in the STEM fields to forget the history soaked into the ideas we take for granted every day. I would like if Math classes gave a little glimpse into this - especially in primary schools. Maybe more kids would appreciate the importance of math and "when we would ever need this in real life".

3.3K Reply

▼ 39 replies



A quick note on image compression: because of the n*log(n) complexity of the FFT it's common to divide the image up into smaller chunks. That's why on poorly compressed images or videos you tend to see blockiness. Now, what's interesting is that when you do that, instead of an FFT it often makes more sense to perform what's called a discrete cosine transform, or DCT, on those tiles. The reason for that is that in less detailed parts of the image, the most prominent components of a tile will be the average colour and an overall colour gradient. In a DCT, that information is mostly contained within the DC component and the first cosine coefficient, whereas in an FFT that information is more a Read more

6 replies

Konstantinos Vasios 14 hours ago (edited)

I studied Electrical & Computer Engineering. Needless to say Fourier Transform was our bread and butter. It is such a pity that usually the historical context is missing in the educational process. It helps so much put things into perspective and get a sense of the purpose and the significance of what you are being taught. I know so many students that are getting discouraged and disappointed just because the educational process only involves sterile mathematics brutally being thrown into your face without any context whatsoever.

rf 163 Reply

▼ 3 replies

paul broadley 16 hours ago

Taking a complex problem, and decomposing it into the history, science and specific use cases is refreshing to see and should be explored more often in STEM education. Thanks Derek, and the team!

rf 289 Reply

▼ 3 replies

Michael Kelly 13 hours ago

You've made some really great videos, but this is your masterpiece (I say that as a retired engineer who studies math and uses Maple recreationally). I knew of Garwin and Tuckey's contributions at the surface level, but the depth of your research was amazing (actually talking to Garwin was really cool). Even more astonishing was Gauss' discovery of the FFT. He is widely regarded as the greatest mathematician of all time, a title disputed by devotees of Euler. Gauss had an aversion to publishing his results until he considered them perfect, and above criticism: his personal motto was "Pauca sed matura", meaning "few, but ripe", describing his publishing habits. Euler, on the othe... Read more

rf \ 83 Reply

3 replies

ElectroBOOM ✓ 15 hours ago

2:16 I'm just happy the nuclear fallouts stopped at the Canadian border, otherwise we could have had it bad here too! 😁 Reply

占 89 **▼** 10 replies

I can't believe how intelligent Gauss was, it's just incredible

Davide 1 day ago

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