



COMETEST

ALLERT!



$$\frac{-\frac{1}{n+1} - \frac{1}{n+2}}{n+2} - \frac{1 - \left(-\frac{1}{n+2}\right)^{n+1}}{n+3} =$$

$$\frac{(-1)^{n+1}}{(n+2)^n} + \frac{(-1)^n \cdot \frac{n+3}{n+1}}{n+1} \cdot \frac{1}{n}$$



I[mA]	0	0	4	50
U[V]	0	0,5	0,6	0,5
I[mA]	0	-1,05	-2,1	
U[V]	0	-1		
I[mA]	0	0		
U[V]	0			
I[mA]				
U[V]				
I[mA]				
U[V]				



$$-Q_1 + Q_2 =$$
$$-C_2 = \epsilon_0 \frac{S}{d_2} U_0^2$$
$$\frac{Q_1 + Q_2}{2} =$$
$$U = \frac{Q}{C_1} = \frac{3}{2} U_0 = 1500 \text{ V}$$
$$\frac{9}{2} \epsilon_0 \frac{S}{d_1} U_0^2 = 9,956 \cdot 10^{-4} \text{ J}$$



$$-e^{i\omega t} + vC_V T_1 (\omega - 1),$$
$$\omega - 1) + vCT_d (1 - e^{i\omega t}),$$

1
00:00:05,910 --> 00:00:02,710
what three blue one brown has done for

2
00:00:07,990 --> 00:00:05,920
mathematics is unsurpassed not only with

3
00:00:10,470 --> 00:00:08,000
the channel but with the summer of math

4
00:00:12,470 --> 00:00:10,480
exposition contest which for those of

5
00:00:14,709 --> 00:00:12,480
you who are unfamiliar is less of a

6
00:00:16,630 --> 00:00:14,719
contest and more of an ethos to create

7
00:00:18,870 --> 00:00:16,640
mathematical explainer videos

8
00:00:21,750 --> 00:00:18,880
collectively during the same time period

9
00:00:23,990 --> 00:00:21,760
i'm a huge huge fan of grant sanderson

10
00:00:25,670 --> 00:00:24,000
the person behind three blue one brown

11
00:00:27,830 --> 00:00:25,680
and the summer of math exposition

12
00:00:30,390 --> 00:00:27,840
contest and thought well since this

13
00:00:32,709 --> 00:00:30,400

channel theories of everything is about

14

00:00:35,030 --> 00:00:32,719

physics and consciousness studies why

15

00:00:37,510 --> 00:00:35,040

not do a similar contest but on those

16

00:00:40,229 --> 00:00:37,520

topics instead a few weeks ago i emailed

17

00:00:43,670 --> 00:00:40,239

grant just to not step on any toes so to

18

00:00:45,990 --> 00:00:43,680

speak and he said go for it so today i'm

19

00:00:48,790 --> 00:00:46,000

announcing the physics and consciousness

20

00:00:50,549 --> 00:00:48,800

explications contest essentially it's a

21

00:00:52,709 --> 00:00:50,559

place and a period for you to submit

22

00:00:54,150 --> 00:00:52,719

your video explainer of a physics

23

00:00:56,389 --> 00:00:54,160

phenomenon or of a consciousness

24

00:00:58,069 --> 00:00:56,399

phenomenon or theory we'll go into

25

00:00:59,830 --> 00:00:58,079

exactly what that means shortly and

26

00:01:01,510 --> 00:00:59,840

brilliant to similarly come on board

27

00:01:04,070 --> 00:01:01,520

with one thousand dollars to give to

28

00:01:05,910 --> 00:01:04,080

each one of the top five winners that is

29

00:01:07,830 --> 00:01:05,920

five thousand divided among five i'll

30

00:01:09,510 --> 00:01:07,840

make a video with the top explainer

31

00:01:11,270 --> 00:01:09,520

videos of course that's extremely

32

00:01:13,350 --> 00:01:11,280

subjective and so i'll be supplementing

33

00:01:15,270 --> 00:01:13,360

that with a playlist inventorying each

34

00:01:17,350 --> 00:01:15,280

of the entries so what's the point of

35

00:01:19,670 --> 00:01:17,360

all of this well number one it's not to

36

00:01:22,070 --> 00:01:19,680

have winners it's to have more

37

00:01:24,310 --> 00:01:22,080

disquisitions on topics that don't have

38

00:01:26,630 --> 00:01:24,320

readily digestible tutorials out there

39

00:01:28,630 --> 00:01:26,640

at least not publicly number two it's to

40

00:01:30,950 --> 00:01:28,640

give a nudge to you or to someone you

41

00:01:33,109 --> 00:01:30,960

know who you want to share this with who

42

00:01:34,469 --> 00:01:33,119

is on the perimeter of deciding to make

43

00:01:36,390 --> 00:01:34,479

a video

44

00:01:38,950 --> 00:01:36,400

but is unsure perhaps the scant

45

00:01:41,670 --> 00:01:38,960

incentive of being recognized with views

46

00:01:43,190 --> 00:01:41,680

or recognized financially with the prize

47

00:01:45,190 --> 00:01:43,200

pushes you in the direction of making

48

00:01:47,270 --> 00:01:45,200

content that you may not have otherwise

49

00:01:49,510 --> 00:01:47,280

number three the top comments on the

50

00:01:51,350 --> 00:01:49,520

three blue one brown youtube video about

51
00:01:54,149 --> 00:01:51,360
the contest is something that i

52
00:01:55,590 --> 00:01:54,159
resonated with blar goner this user said

53
00:01:57,749 --> 00:01:55,600
that it's unfortunate that the more

54
00:01:59,670 --> 00:01:57,759
advanced videos which explicitly assumed

55
00:02:02,149 --> 00:01:59,680
some prerequisite knowledge got down

56
00:02:04,950 --> 00:02:02,159
voted and flagged as being unclear not

57
00:02:06,709 --> 00:02:04,960
explaining jargon etc despite such

58
00:02:08,550 --> 00:02:06,719
entries indeed being allowed by the

59
00:02:09,910 --> 00:02:08,560
general guidelines in the future

60
00:02:11,910 --> 00:02:09,920
consider having different levels of

61
00:02:14,390 --> 00:02:11,920
submission for example advanced the

62
00:02:16,470 --> 00:02:14,400
point is i have also found that a large

63
00:02:18,949 --> 00:02:16,480

segment of the youtube population is

64

00:02:20,710 --> 00:02:18,959

starved for content for advanced content

65

00:02:22,710 --> 00:02:20,720

perhaps at the graduate or upper year

66

00:02:24,390 --> 00:02:22,720

undergraduate level however most of the

67

00:02:26,470 --> 00:02:24,400

content out there is directed toward the

68

00:02:28,070 --> 00:02:26,480

high school level the toe podcast at

69

00:02:29,990 --> 00:02:28,080

least in some ways can be thought of as

70

00:02:31,830 --> 00:02:30,000

speaking to that starved segment though

71

00:02:35,030 --> 00:02:31,840

while in podcast form much can be

72

00:02:36,710 --> 00:02:35,040

traversed quickly much concepts verbally

73

00:02:39,110 --> 00:02:36,720

still plenty is lost because there

74

00:02:41,509 --> 00:02:39,120

aren't equations and animations it would

75

00:02:43,830 --> 00:02:41,519

be great if that lacuna was filled that

76

00:02:46,309 --> 00:02:43,840

is more advanced graduate topics since

77

00:02:48,390 --> 00:02:46,319

the lower year undergraduate topics seem

78

00:02:50,710 --> 00:02:48,400

to get all the attention so for example

79

00:02:53,270 --> 00:02:50,720

if you have a thesis or a capstone

80

00:02:54,630 --> 00:02:53,280

project for your masters or your phd and

81

00:02:57,030 --> 00:02:54,640

you'd like to distill it down to its

82

00:02:58,949 --> 00:02:57,040

essence then communicate it via video

83

00:03:00,869 --> 00:02:58,959

and submit let's get on to tips so

84

00:03:02,630 --> 00:03:00,879

number one choose a video that you would

85

00:03:04,550 --> 00:03:02,640

like to see created a video that you

86

00:03:06,790 --> 00:03:04,560

wish existed and perhaps even in the

87

00:03:08,309 --> 00:03:06,800

style that you wish existed number two

88

00:03:09,990 --> 00:03:08,319

don't just use powerpoint slides and

89

00:03:11,830 --> 00:03:10,000

talk through it okay so what are some

90

00:03:14,390 --> 00:03:11,840

ideas of potential videos to be

91

00:03:16,630 --> 00:03:14,400

submitted well firstly if you're unsure

92

00:03:18,149 --> 00:03:16,640

join the discord the link will be in the

93

00:03:20,869 --> 00:03:18,159

description as well as you can just

94

00:03:24,149 --> 00:03:20,879

visit tinyurl.com

95

00:03:26,869 --> 00:03:24,159

discord toe that is t-o-e but on to some

96

00:03:28,710 --> 00:03:26,879

examples what is yang mills theory how

97

00:03:31,030 --> 00:03:28,720

does the etia singer index theorem

98

00:03:33,430 --> 00:03:31,040

relate to physics what is a lagrangian

99

00:03:35,270 --> 00:03:33,440

manifold and why is the symplectic creed

100

00:03:37,990 --> 00:03:35,280

that everything is a lagrangian some

101

00:03:39,589 --> 00:03:38,000

manifold what's an euler class or if

102

00:03:41,509 --> 00:03:39,599

you're daring what's the churn

103

00:03:44,470 --> 00:03:41,519

gauss-bonnet's theorem's implications

104

00:03:46,550 --> 00:03:44,480

for supersymmetry what is e_8 as a lead

105

00:03:49,110 --> 00:03:46,560

group and what's that's relation to the

106

00:03:50,869 --> 00:03:49,120

e_8 lattice or you can take some theory

107

00:03:52,630 --> 00:03:50,879

of everything that exists so string

108

00:03:54,869 --> 00:03:52,640

theory and explain some concept within

109

00:03:57,030 --> 00:03:54,879

it or for example wolfram's physics

110

00:03:58,789 --> 00:03:57,040

project and explain how black holes are

111

00:04:00,949 --> 00:03:58,799

formed or the maximum quantum

112

00:04:03,030 --> 00:04:00,959

entanglement speed or in loop quantum

113

00:04:04,789 --> 00:04:03,040

cosmology perhaps you'd like to explain

114

00:04:06,949 --> 00:04:04,799

what ashtakar variables are and why

115

00:04:08,869 --> 00:04:06,959

they're useful what's a sigma model

116

00:04:10,710 --> 00:04:08,879

what's the symplectic version of quantum

117

00:04:12,470 --> 00:04:10,720

mechanics how do you formulate quantum

118

00:04:14,390 --> 00:04:12,480

mechanics without complex numbers and

119

00:04:16,390 --> 00:04:14,400

what are the tradeoffs and benefits now

120

00:04:18,469 --> 00:04:16,400

on the consciousness side some example

121

00:04:20,390 --> 00:04:18,479

videos would be to explain yoshibok's

122

00:04:22,629 --> 00:04:20,400

computational model of consciousness now

123

00:04:25,510 --> 00:04:22,639

hey good luck with that or to explain

124

00:04:27,990 --> 00:04:25,520

bernardo castro's analytical idealism or

125

00:04:29,830 --> 00:04:28,000

to explain why phi has anything to do

126

00:04:31,909 --> 00:04:29,840

with consciousness in integrated

127

00:04:33,510 --> 00:04:31,919

information theory or why it may not and

128

00:04:35,590 --> 00:04:33,520

you can explain global neuronal

129

00:04:37,830 --> 00:04:35,600

workspace theory what are the technical

130

00:04:39,670 --> 00:04:37,840

problems perhaps epistemic perhaps

131

00:04:41,350 --> 00:04:39,680

ontological with having neural

132

00:04:43,350 --> 00:04:41,360

correlates of consciousness be an

133

00:04:45,350 --> 00:04:43,360

explainer of consciousness how does

134

00:04:47,030 --> 00:04:45,360

douglas hofstede's strange loop concept

135

00:04:48,870 --> 00:04:47,040

work and where does it fall short you

136

00:04:50,629 --> 00:04:48,880

can even combine consciousness and

137

00:04:52,550 --> 00:04:50,639

physics with an explainer of

138

00:04:54,870 --> 00:04:52,560

orchestrated objective reduction that's

139

00:04:56,790 --> 00:04:54,880

penrose's theory or perhaps you can

140

00:04:58,790 --> 00:04:56,800

explain just an aspect of it that is

141

00:05:00,390 --> 00:04:58,800

what is frolic resonance there was a

142

00:05:02,469 --> 00:05:00,400

study recently that apparently shows

143

00:05:04,790 --> 00:05:02,479

some limits of certain quantum theories

144

00:05:06,629 --> 00:05:04,800

of consciousness well does it what are

145

00:05:08,150 --> 00:05:06,639

the limitations of this study what is

146

00:05:10,070 --> 00:05:08,160

conway's free will theorem it doesn't

147

00:05:11,670 --> 00:05:10,080

have anything to do with free will what

148

00:05:14,070 --> 00:05:11,680

is super determinism and now we're back

149

00:05:15,990 --> 00:05:14,080

on the physics side sabine haasenfelter

150

00:05:18,070 --> 00:05:16,000

is working assiduously on that so you're

151
00:05:20,469 --> 00:05:18,080
welcome to email her and say hey would

152
00:05:22,230 --> 00:05:20,479
it be okay if i took some voice clips of

153
00:05:24,469 --> 00:05:22,240
yours from this time stamp and this time

154
00:05:26,950 --> 00:05:24,479
stamp and added animations perhaps your

155
00:05:28,950 --> 00:05:26,960
own narration some people in the toe

156
00:05:31,029 --> 00:05:28,960
audience are studying neuroscience and

157
00:05:32,790 --> 00:05:31,039
so if you want you can show how machine

158
00:05:35,590 --> 00:05:32,800
learning is related to concepts in

159
00:05:36,870 --> 00:05:35,600
consciousness or qualia or perception

160
00:05:39,430 --> 00:05:36,880
because perhaps that's what you're

161
00:05:41,909 --> 00:05:39,440
writing your phd thesis on feel free to

162
00:05:43,189 --> 00:05:41,919
go ahead and make a video even if it

163
00:05:45,029 --> 00:05:43,199

means that you're submitting to two

164

00:05:46,710 --> 00:05:45,039

different places like your advisor

165

00:05:48,550 --> 00:05:46,720

perhaps another contest that doesn't

166

00:05:50,790 --> 00:05:48,560

matter to me in fact i encourage it

167

00:05:52,469 --> 00:05:50,800

because it adds extra motivation i

168

00:05:54,790 --> 00:05:52,479

should emphasize that you don't have to

169

00:05:57,590 --> 00:05:54,800

submit an idea that incorporates both

170

00:05:59,430 --> 00:05:57,600

physics and consciousness but instead

171

00:06:01,830 --> 00:05:59,440

it's best to just focus on one of the

172

00:06:03,510 --> 00:06:01,840

two that is make a physics submission or

173

00:06:05,990 --> 00:06:03,520

make a consciousness submission as

174

00:06:07,909 --> 00:06:06,000

generally those that try to combine both

175

00:06:10,629 --> 00:06:07,919

tend to lack the rigor that we're aiming

176
00:06:11,670 --> 00:06:10,639
for with pace one there are exceptions

177
00:06:13,990 --> 00:06:11,680
of course

178
00:06:16,390 --> 00:06:14,000
again if you're unsure if your idea for

179
00:06:20,390 --> 00:06:16,400
your video fits then visit the discord

180
00:06:22,550 --> 00:06:20,400
and ask that's tinyurl.com

181
00:06:24,550 --> 00:06:22,560
toe okay so what are the rules well

182
00:06:26,629 --> 00:06:24,560
number one you're allowed to submit to

183
00:06:28,469 --> 00:06:26,639
multiple contests that is to say if

184
00:06:30,550 --> 00:06:28,479
you're submitting to summer of math

185
00:06:32,150 --> 00:06:30,560
exposition number two that doesn't

186
00:06:34,390 --> 00:06:32,160
preclude you from submitting here as

187
00:06:37,110 --> 00:06:34,400
well another rule is that you must make

188
00:06:38,790 --> 00:06:37,120

your video public it can't be unlisted

189

00:06:40,710 --> 00:06:38,800

because the primary point is to have

190

00:06:43,029 --> 00:06:40,720

more commentary and explorations on

191

00:06:45,830 --> 00:06:43,039

physics and consciousness both prevalent

192

00:06:48,150 --> 00:06:45,840

and overt number three unlike the three

193

00:06:50,469 --> 00:06:48,160

blue one brown video this is exclusive

194

00:06:52,150 --> 00:06:50,479

to video content so no blog posts are

195

00:06:54,550 --> 00:06:52,160

allowed number four is make sure that

196

00:06:56,790 --> 00:06:54,560

you have one entry per group or per

197

00:06:59,510 --> 00:06:56,800

individual and it also needs to be in

198

00:07:01,589 --> 00:06:59,520

english another rule is to please use

199

00:07:04,309 --> 00:07:01,599

the hashtag that's on screen in your

200

00:07:07,990 --> 00:07:04,319

submission title and lastly the deadline

201
00:07:11,029 --> 00:07:08,000
for submission is october 12th 2022 11

202
00:07:13,430 --> 00:07:11,039
59 pm toronto time i don't want to be

203
00:07:15,350 --> 00:07:13,440
kept too late past my bedtime now let's

204
00:07:17,909 --> 00:07:15,360
get to what are some possible styles for

205
00:07:19,909 --> 00:07:17,919
the videos so obviously you could do a

206
00:07:22,070 --> 00:07:19,919
lecture with a blackboard and a tablet

207
00:07:24,230 --> 00:07:22,080
that's not terribly engaging but perhaps

208
00:07:26,390 --> 00:07:24,240
you can make it so there's animation

209
00:07:27,830 --> 00:07:26,400
that's the three blue one brown style

210
00:07:29,670 --> 00:07:27,840
that's extremely difficult but

211
00:07:31,670 --> 00:07:29,680
wonderfully engaging number three you

212
00:07:33,430 --> 00:07:31,680
can make it a documentary style so i'll

213
00:07:35,589 --> 00:07:33,440

give some examples of those on screen

214

00:07:38,230 --> 00:07:35,599

right now number four is you can make it

215

00:07:40,070 --> 00:07:38,240

exploratory where you throw out ideas

216

00:07:41,589 --> 00:07:40,080

it's you learning the topic you going

217

00:07:43,510 --> 00:07:41,599

through a journey you're showing your

218

00:07:45,270 --> 00:07:43,520

mistakes along the way open questions

219

00:07:46,869 --> 00:07:45,280

you still have showing connections

220

00:07:49,189 --> 00:07:46,879

between different fields and related

221

00:07:51,029 --> 00:07:49,199

concepts it's not you as an expert it's

222

00:07:53,029 --> 00:07:51,039

you as a student learning the topic

223

00:07:55,110 --> 00:07:53,039

another style is to take some work that

224

00:07:57,110 --> 00:07:55,120

exists and remix it with the original

225

00:07:59,749 --> 00:07:57,120

creator's permission of course so for

226

00:08:02,550 --> 00:07:59,759

example richard borchard's leech lattice

227

00:08:03,670 --> 00:08:02,560

explanation or donald hoffman here or

228

00:08:05,510 --> 00:08:03,680

like i mentioned with sabine

229

00:08:08,230 --> 00:08:05,520

haasenfelder and super determinism

230

00:08:10,070 --> 00:08:08,240

another style is to take an article or a

231

00:08:11,749 --> 00:08:10,080

paper that you want to learn and then

232

00:08:14,230 --> 00:08:11,759

you go through it so for example the

233

00:08:16,150 --> 00:08:14,240

papers that got written the fields metal

234

00:08:17,670 --> 00:08:16,160

at least in part the jones polynomial

235

00:08:19,749 --> 00:08:17,680

you go through it and then you explain

236

00:08:21,990 --> 00:08:19,759

it maybe line by line or maybe paragraph

237

00:08:23,909 --> 00:08:22,000

by paragraph or page by page or combine

238

00:08:26,150 --> 00:08:23,919

it with animations or simply just remix

239

00:08:28,790 --> 00:08:26,160

it with any of these styles okay so now

240

00:08:31,110 --> 00:08:28,800

what are the criteria for winning

241

00:08:33,430 --> 00:08:31,120

again please this is not about winning

242

00:08:35,829 --> 00:08:33,440

this is simply to have more explications

243

00:08:37,750 --> 00:08:35,839

out there however if you're interested

244

00:08:39,990 --> 00:08:37,760

one of the criteria is to take something

245

00:08:42,469 --> 00:08:40,000

that's traditionally complex and then

246

00:08:44,630 --> 00:08:42,479

make it digestible so that is this ratio

247

00:08:46,790 --> 00:08:44,640

between complexity and simplicity so for

248

00:08:48,790 --> 00:08:46,800

example elucidating what yang mills

249

00:08:50,310 --> 00:08:48,800

theory is rigorously is notoriously

250

00:08:53,030 --> 00:08:50,320

difficult perhaps you can find some

251

00:08:55,829 --> 00:08:53,040

analogies to make it more digestible

252

00:08:58,550 --> 00:08:55,839

not exactly simple simple the incorrect

253

00:09:01,269 --> 00:08:58,560

word number two it needs to be engaging

254

00:09:04,870 --> 00:09:01,279

and entertaining and then number three

255

00:09:06,949 --> 00:09:04,880

is that you keep in the rigor so no hand

256

00:09:08,389 --> 00:09:06,959

waving no

257

00:09:10,790 --> 00:09:08,399

if you're doing something regarding

258

00:09:13,190 --> 00:09:10,800

consciousness no using the word quantum

259

00:09:14,870 --> 00:09:13,200

as some let's say new age people may

260

00:09:17,030 --> 00:09:14,880

incorrectly use the words that they

261

00:09:19,030 --> 00:09:17,040

sound more scientific instead for this

262

00:09:21,430 --> 00:09:19,040

contest please stick to equations

263

00:09:23,990 --> 00:09:21,440

precision and logical rigor and when i

264

00:09:25,590 --> 00:09:24,000

say rigor i mean a physicist rigor which

265

00:09:28,070 --> 00:09:25,600

essentially is a mathematician's hand

266

00:09:30,150 --> 00:09:28,080

wavy but you understand what i mean good

267

00:09:32,230 --> 00:09:30,160

luck and again if you have questions go

268

00:09:34,070 --> 00:09:32,240

to the discord which is linked below

269

00:09:37,030 --> 00:09:34,080

tinyurl.com

270

00:09:39,030 --> 00:09:37,040

discord t-o-e as well as it's in the

271

00:09:40,949 --> 00:09:39,040

description for the rest of this video

272

00:09:43,430 --> 00:09:40,959

i'll be going through some examples of

273

00:09:45,730 --> 00:09:43,440

explications that exist that i think are

274

00:09:58,120 --> 00:09:45,740

particularly wonderful