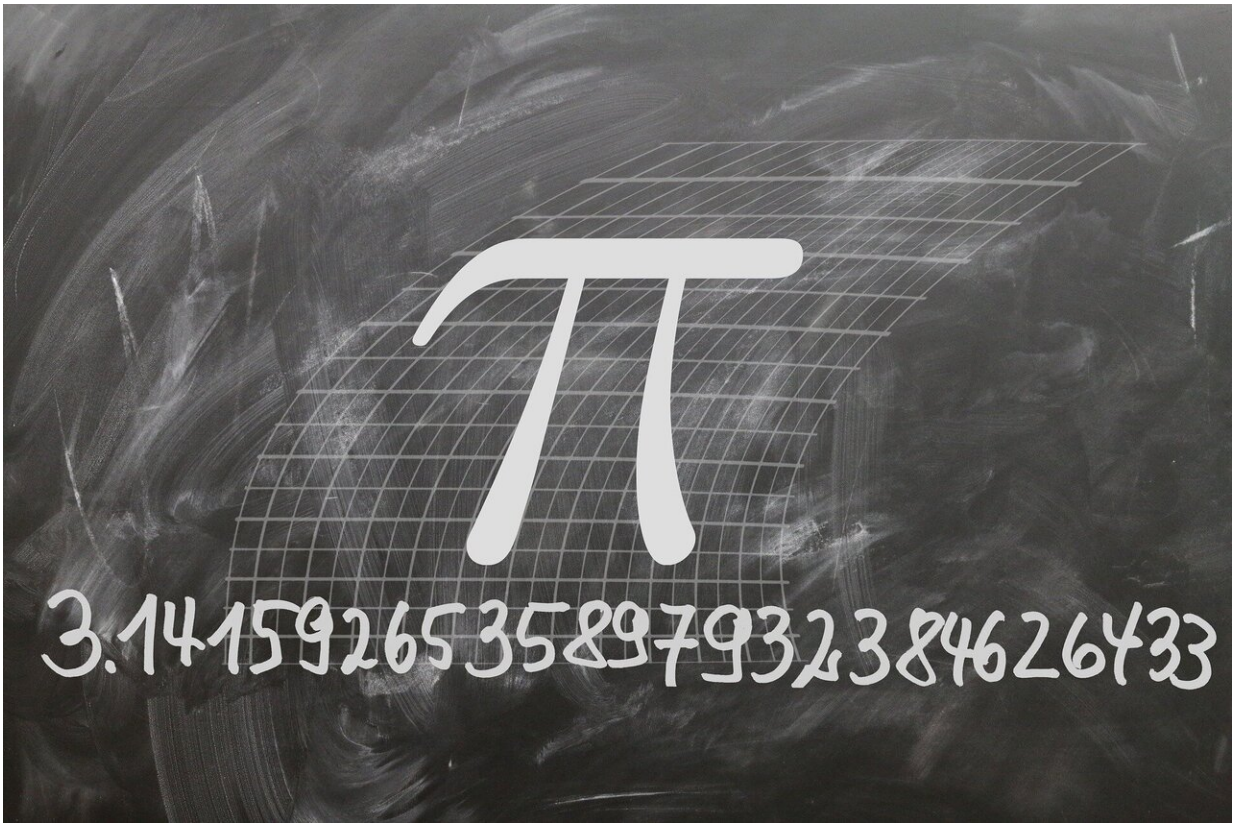


Ramanujan machine automatically generates conjectures for fundamental constants

July 15 2019, by Bob Yirka



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A team of researchers at the Israel Institute of Technology has built what they describe as a Ramanujan machine—a device that automatically generates conjectures (mathematical statements that are proposed as true

statements) for fundamental constants. They have written a paper describing their device and have uploaded it to the *arXiv* preprint server. They have also created a webpage for people who wish to allow the network to use their computer's process cycles, suggest a proof or develop code toward new mathematical structures.

The Ramanujan machine is named for famed Indian [mathematician](#) Srinivasa Ramanujan, a self-taught mathematician who grew up in India and was "discovered" by fellow mathematician G.H. Hardy. After moving to England, he became a fixture at Cambridge, where he shook up the math world with his unorthodox mathematics—instead of pounding away at math proofs, he obtained results to famous problems through intuition and then let others find the proofs for them. Because of this, he was sometimes described as a [conjecture](#) machine, pulling formulas out of thin air as if they received from a higher being—sometimes in dreams. In this new effort, the researchers in Israel have sought to replicate this approach using computing power.

The Ramanujan machine is more of a concept than an actual machine—it exists as a network of computers running algorithms dedicated to finding conjectures about fundamental constants in the form of continued [fractions](#)—these are defined as fractions of infinite length where the denominator is a certain quantity plus a fraction, where a latter fraction has a similar denominator, etc.) The purpose of the machine is to come up with conjectures (in the form of mathematical formulas) that humans can analyze, and hopefully prove to be true mathematically. The team that created the machine is hoping that their idea will inspire future generations of mathematicians—to that end, they note that any new algorithms, proofs or conjectures developed by a participant will be named after them. The researchers note that their machine has already discovered dozens of new conjectures.

More information: Gal Raayoni et al. The Ramanujan Machine:

Automatically Generated Conjectures on Fundamental Constants
arXiv:1907.00205v1 [cs.LG]: arxiv.org/abs/1907.00205

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