Data set contents

Title: Computer-assisted proof of kernel inequalities

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List of files, types, and sizes:

File name	Type	Size
`constructions.sage`	Sage code (plain text)	10.4 KB
`kernels.sage`	Sage code (plain text)	14.3 KB
`middle.sage`	Sage code (plain text)	5.1 KB
`nonsingular.sage`	Sage code (plain text)	2.6 KB
`nonsingular24dtrunc.sage`	Sage code (plain text)	4.6 KB
`processcorner.sage`	Sage code (plain text)	4.5 KB
`processcorner24dtrunc.sage`	Sage code (plain text)	8.1 KB
`rectangles.sage`	Sage code (plain text)	2.7 KB
`setup.sage`	Sage code (plain text)	21.3 KB
`verifyall.sage`	Sage code (plain text)	7.4 KB
`numerics.pdf`	PDF file	350 KB
`Mathematica.tar`	Tar file containing Mathematica notebooks	51.6 MB

Notes:

This data set contains code for the computer calculations needed to prove Proposition 6.1 in the paper *Universal optimality of the E_8 and Leech lattices and interpolation formulas* by H. Cohn, A. Kumar, S. D. Miller, D. Radchenko, and M. Viazovska. As discussed in that paper, we include two versions of the proof, one using SageMath and the other using Mathematica.

The Sage code is contained in the ten Sage files listed above; the main file is `verifyall.sage`, which loads the other files as needed. This code can be run via the SageMath command `load("verifyall.sage")`. We ran the code using Version 9.5 of the open-source computer algebra system SageMath, which is available from `https://www.sagemath.org`. The document `numerics.pdf` explains how the Sage code works.

The Mathematica code is contained in a number of Mathematica notebooks, which we have combined into the tar file `Mathematica.tar` here. The tar file also includes a `README.txt` file that explains how to verify the proof, and the notebooks give some explanation alongside the code. We ran the code using Version 11.1.1 of Mathematica, which is available from Wolfram Research.