UC Merced Applied Math Problem of the Month

November 2022

$$\text{What is } \max \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}$$

$$\text{if } a_{ij} \in \{-1, 0\}?$$

You construct a 3×3 matrix by randomly choosing either -1 or 0 (with equal probability) for each component. What is the maximum value that its determinant can have? If you generate many random matrices in this way, how often do you get this maximum value? What if you choose -1, 0, or 1 for each component?

To submit your solutions for a chance to win an Amazon gift card or a department glass, and to find out detailed contest rules,

- scan the QR code to the right, or
- go to https://appliedmath.ucmerced.edu/news-events/problem-month