

PLOTS OF ADD, SUBTRACT, AND MULTIPLY

Below are 3D plots of addition, subtraction, and three forms of multiplication, of unsigned numbers, using “computer arithmetic.” These plots were produced by Mathematica. For each function, two plots are shown, one for a word size of three bits and the other for a word size of five bits.

This material was suggested by Guy Steele.

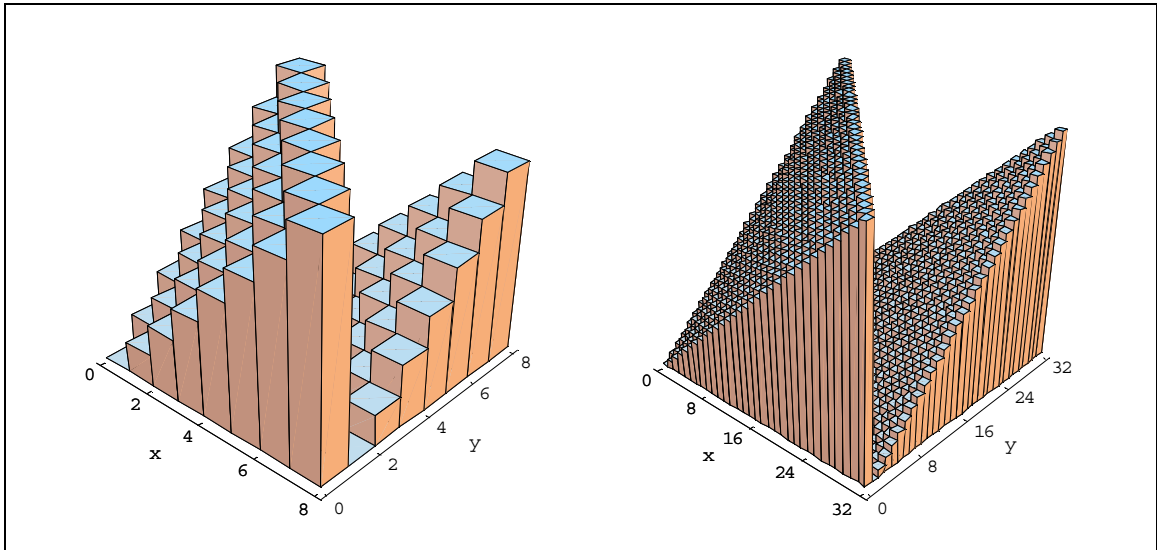


FIGURE 1. Plots of $x + y$ (computer arithmetic).

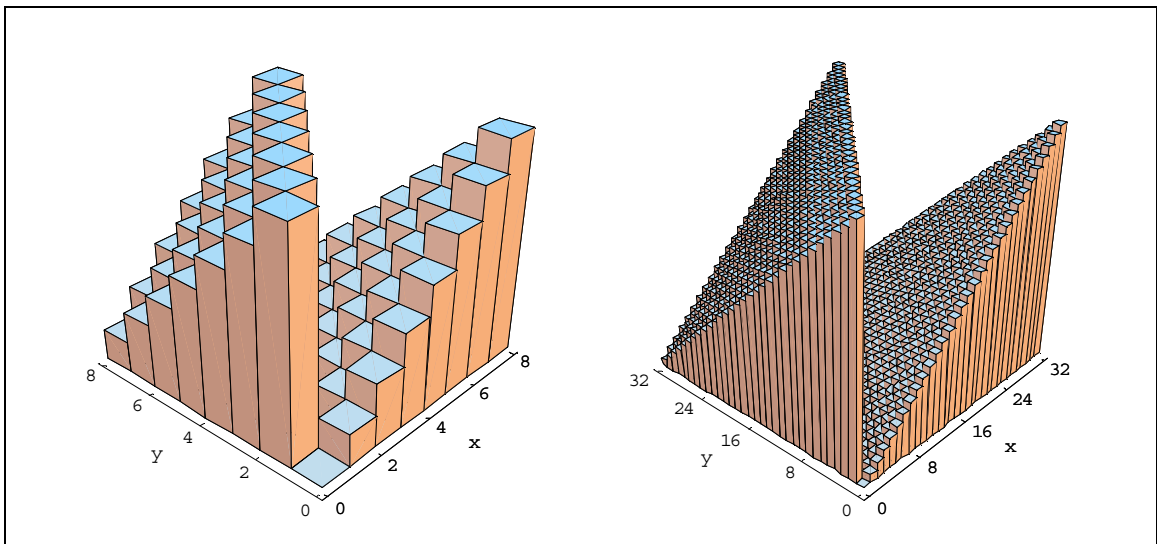


FIGURE 2. Plots $x - y$ (computer arithmetic).

In Figure 3, the vertical scales are compressed; the highest peaks in the left figure are of height $7 \cdot 7 = 49$

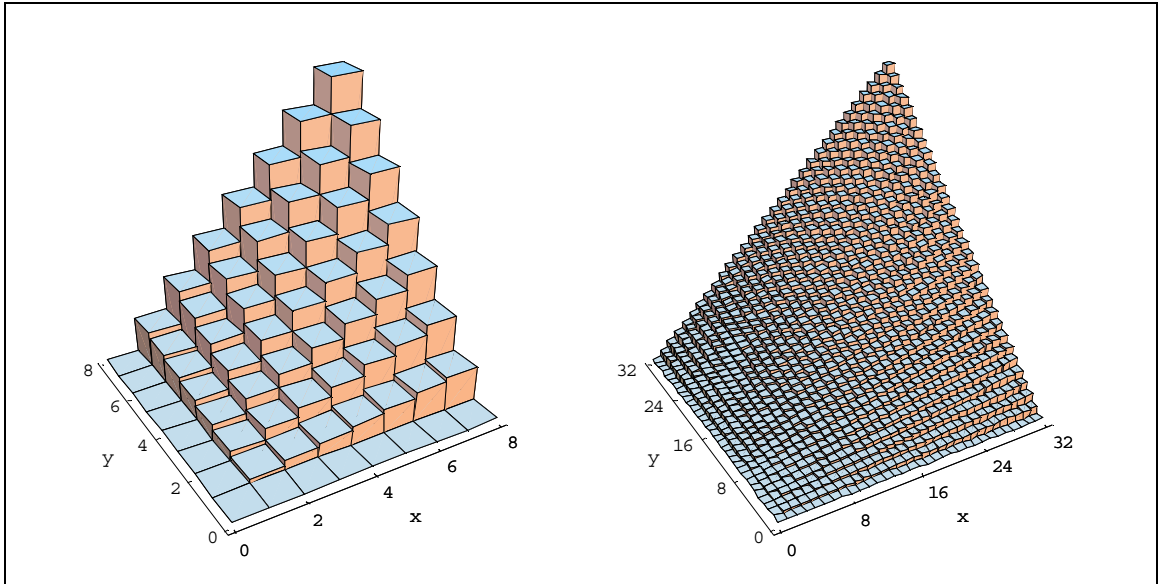


FIGURE 3. Plots of the unsigned product of x and y .

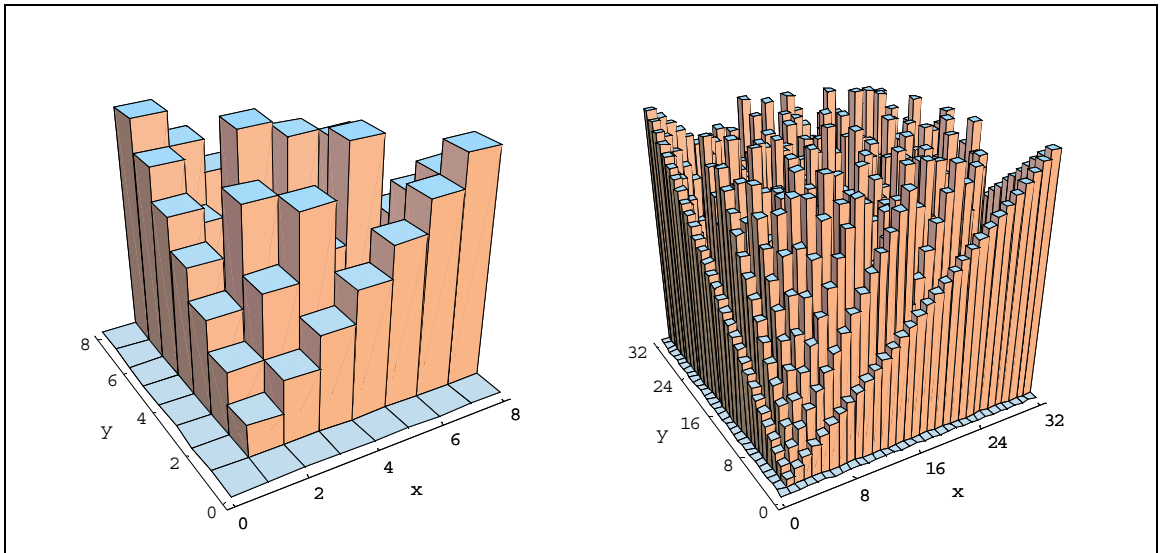


FIGURE 4. Plots of the low-order half of the unsigned product of x and y .

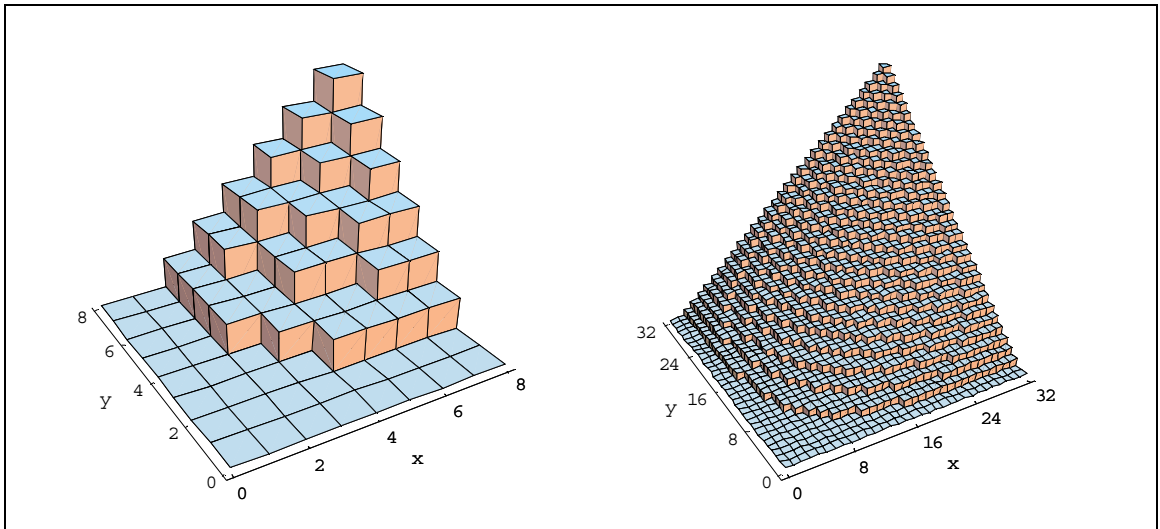


FIGURE 5. Plots of the high-order half of the unsigned product of x and y .