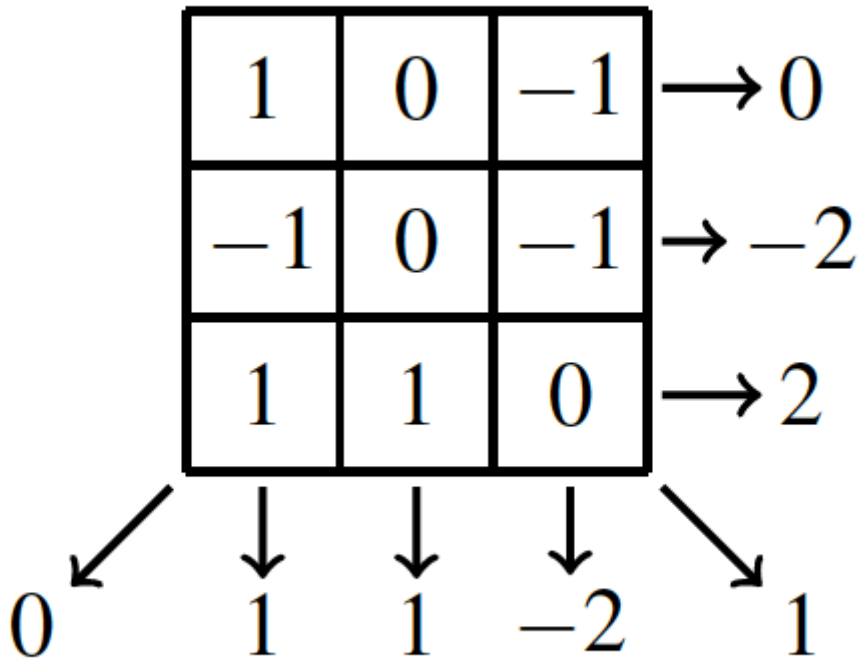
An (-1,0,1) Antimagic Square

Problem: antimagic square. Is it possible to fill a 3×3 grid with the integers $-1, 0, 1$ so that the sums of each row, each column, and both diagonals are different?

The following figure gives an example of an unsuccessful attempt.



Here the sums of the first two columns are the same.

Howver, this figure suggests the reason why this is impossible: we want eight integers (the sums of three rows, three columns, and two diagonals) to be different, but there are only seven possibilities for the sums:
$-3, -2, -1, 0, 1, 2, 3$.