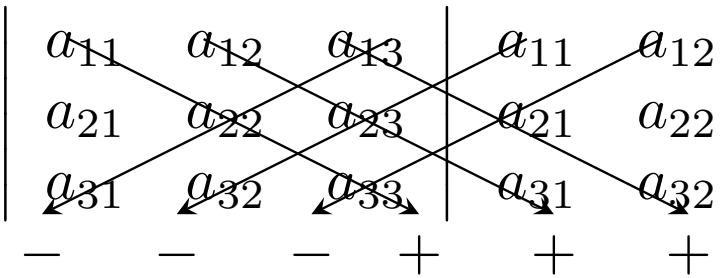
A Memory Device

Therefore we have

$$|A| = a_{11}a_{22}a_{33} + a_{12}a_{23}a_{31} + a_{13}a_{21}a_{32}$$
$$- a_{11}a_{23}a_{32} - a_{12}a_{21}a_{33} - a_{13}a_{22}a_{31}$$

The following figure shows a good memory device for this formula:



Note: The number of permutations of $(1, 2, 3)$ is $3! = 6$. The number of permutations of $(1, 2, 3, 4)$ is $4! = 24$, so this same memory device **fails** for 4×4 matrices.