Matrix Medians

- Permutations can be seen as matrices
- Norm of A = rank of A – I
- Median of matrices A, B, C: M such that

  rank(A – M) + rank(B – M) + rank(C – M)

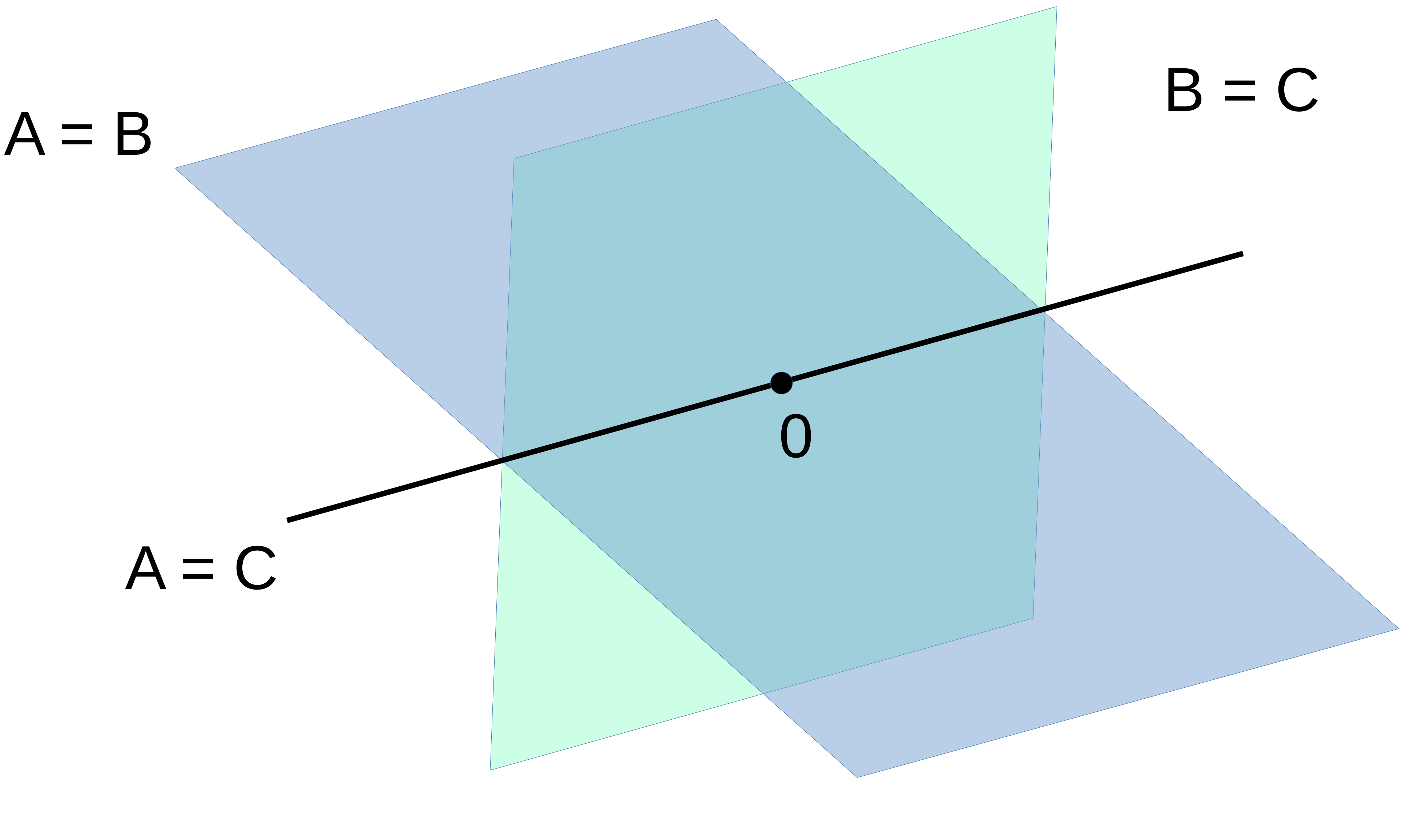
  is mimimum

Finding medians

- Small rank(A – M)
- Large vector space where A = M

- The same must happen with B and C

Spaces where matrices agree



Decomposing R^n

<table>
<tr><td colspan="3">k_5 $V_*(.A.B.C.)$ M = A, B, or C</td></tr>
<tr><td>k_3
$V_*(.A.BC.)$
M = B</td><td>k_2
$V_*(.AB.C.)$
M = A</td><td>k_4
$V_*(.AC.B.)$
M = A</td></tr>
<tr><td colspan="3">k_1 $V_*(.ABC.)$ M = A</td></tr>
</table>

$$k_1 + k_2 + k_3 + k_4 + k_5 = n$$

Median approximations

- $M_A = A$ in $V_*(.A.B.C.)$
- M_B, M_C are defined similarly
- M_A, M_B, M_C are approximations to a median

$d(M_X; A, B, C) \leq 4/3$ median score