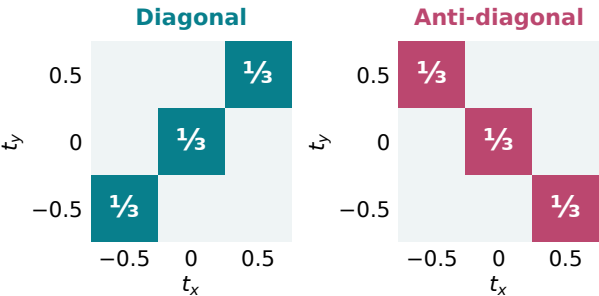


The same marginals can hide different feature responses

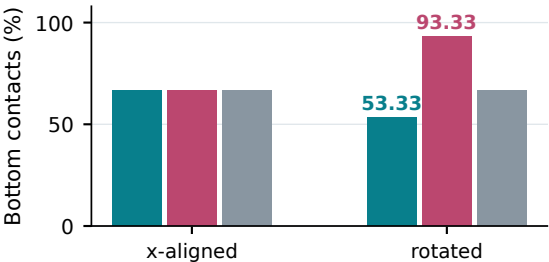
PVD transport insight | Original nine-direction model | No measured data

(a) Correlation hidden by the marginals



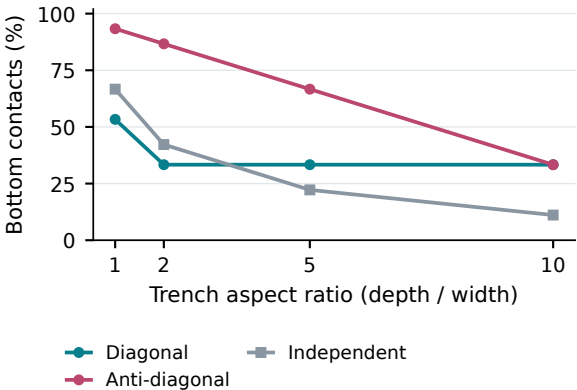
Each x and y marginal is $(1/3, 1/3, 1/3)$.
Cells show opening-conditioned probability mass.

(b) Rotation reveals the difference

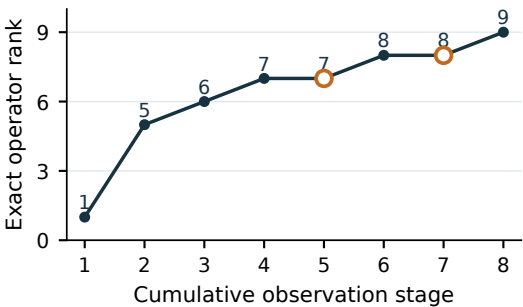


Aspect ratio 1; across-directions:
 $(1, 0)$ and $(0.6, 0.8)$, a rotation of 53.13° .

(c) Geometry changes the response



(d) More signals need not add information



○ Stages 5 and 7 add no rank.
Rank 9 identifies only this imposed basis.

Stages: 1 total; 2 complete x/y marginals; 3 + rotated bottom (AR 1); 4 + rotated bottom (AR 5); 5 + rotated imbalance (AR 1); 6 + rotated imbalance (AR 5); 7 + orthogonal bottom (AR 5); 8 + orthogonal imbalance (AR 5). Imbalance = right minus left; orthogonal vector = $(-0.8, 0.6)$.
Denominator: arrivals through the opening. Static first-contact geometry; not film thickness or calibrated detector inversion.