random_X_and_structured_Beta 0.56 -0.8 -0.8 0.54 0.575 opserved 0.52 0.6 0.6 0.550 0.4 -0.4 0.525 0.48 -0.2 0.2 -0.025 0.05 300 500 1000 2000 0.1 0.2 0.4 600 1200 2400 4800 100 200 20 60 0.72 -0.70 0.8 0.8 ORC Line 0.70 -0.6 0.6 0.68 -0.60 0.4 -0.4 0.55 -0.025 0.4 300 100 0.05 1200 4800 2000 0.1 0.2 600 2400 200 500 80 1000 20 40 60

method → IBMR_int → IBMR_no_Gamma → subset → relabel

S

Ν

method \rightarrow IBMR_int $-\Delta \cdot$ IBMR_no_Gamma

Beta_FPR

batch_effect

random_X_and_structured_Beta 3800 -peared 3500 3000 -3400 -0.025 0.05 0.1 0.2 0.4 4000 -ORC_fine 3450 3300 -**-**

Beta_SSE

0.025

0.05

0.1

batch_effect

0.2

0.4

Ν



р

S

random_X_and_structured_Beta 0.990 -1.0 0.99 0.99 0.9 opserved 0.98 0.8 0.98 0.97 0.980 0.7 0.96 0.97 0.6 0.95 -0.975 0.025 300 1200 500 2000 0.05 0.1 0.2 0.4 600 2400 4800 100 200 1000 20 40 60 1.00 -1.00 1.00 0.95 -0.992 -0.99 ORC_fine 0.99 0.90 0.98 0.85 0.98 0.984 -0.97 0.80 0.97 0.025 300 600 1200 4800 100 0.05 0.2 0.4 2400 200 500 1000 2000 0.1 20 60 80 40 batch_effect Ν

method → IBMR_int → IBMR_no_Gamma → subset → relabel

method → IBMR_int -△· IBMR_no_Gamma

S

Beta_TPR

random_X_and_structured_Beta 0.8 -0.55 0.54 -0.49 0.50 0.52 -0.6 0.52 0.50 0.48 0.45 0.4 0.47 0.48 -0.40 0.025 300 1200 100 2000 0.2 0.4 600 2400 4800 200 500 1000 0.05 0.1 20 0.7 error 0.45 0.43 0.6 0.42 -ORC_fine 0.40 0.5 0.42 0.4 0.41 0.35 0.3 0.40 0.40 0.30 0.2 100 0.025 1200 500 2000 0.05 0.4 300 600 2400 4800 200 1000 0.1 0.2 20 60 80 batch_effect Ν р S

method → IBMR_int → IBMR_no_Gamma → subset → relabel

method \rightarrow IBMR_int $-\triangle \cdot$ IBMR_no_Gamma

random_X_and_structured_Beta 10.0 -12 20 -9.5 11 observed 10 15 -9.0 8.5 10 -8.0 9 -7.5 0.025 300 1200 4800 100 200 0.05 0.2 0.4 600 2400 500 1000 2000 20 80 0.1 10 -7.50 -8.5 15 · 7.25 ORC fine 7.5 10 7.00 7.0 -6.75 6.5 0.025 100 0.4 300 600 4800 200 1000 2000 0.2 1200 2400 500 80 0.05 20 40

KL_divergence

batch_effect

method → IBMR_int -△· IBMR_no_Gamma method → IBMR_int → IBMR_no_Gamma → subset → relabel

S

Ν