**Correlation between PFM and Fluxomic data**

**Lambda has been optimized using CV**

| Simulated flux with out noise | Without noise | | | With 2% Error | | | With 5% Error | | | With 10% Error | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | pc1 | pc2 | pc3 | pc1 | pc2 | pc3 | pc1 | pc2 | pc3 | pc1 | pc2 | pc3 |
| 1 | -0.16 | 0.76 | 0.18 | -0.16 | 0.57 | 0.75 | -0.16 | 0.57 | 0.75 | -0.16 | 0.57 | 0.75 |
| 2 | 0.91 | 0.16 | -0.17 | 0.91 | 0.33 | 0.13 | 0.91 | 0.33 | 0.13 | 0.91 | 0.33 | 0.13 |
| 3 | 0.03 | 0.46 | -0.02 | 0.02 | 0.78 | 0.42 | 0.02 | 0.78 | 0.42 | 0.02 | 0.78 | 0.42 |
| 4 | -0.20 | 0.63 | 0.28 | -0.20 | 0.44 | 0.63 | -0.20 | 0.44 | 0.63 | -0.20 | 0.44 | 0.63 |
| 5 | 0.90 | 0.15 | -0.18 | 0.90 | 0.34 | 0.13 | 0.90 | 0.34 | 0.13 | 0.90 | 0.34 | 0.13 |
| 6 | 0.02 | 0.43 | -0.01 | 0.01 | 0.76 | 0.39 | 0.01 | 0.76 | 0.39 | 0.01 | 0.76 | 0.39 |
| 7 | -0.10 | 0.85 | 0.08 | -0.10 | 0.66 | 0.83 | -0.10 | 0.66 | 0.83 | -0.10 | 0.66 | 0.83 |
| 8 | 0.91 | 0.16 | -0.19 | 0.91 | 0.34 | 0.14 | 0.91 | 0.34 | 0.14 | 0.91 | 0.34 | 0.14 |
| 9 | 0.01 | 0.34 | 0.01 | 0.00 | 0.68 | 0.30 | 0.00 | 0.68 | 0.30 | 0.00 | 0.68 | 0.30 |
| 10 | -0.19 | 0.67 | 0.25 | -0.19 | 0.48 | 0.66 | -0.19 | 0.48 | 0.66 | -0.19 | 0.48 | 0.66 |
| 11 | 0.90 | 0.08 | -0.17 | 0.90 | 0.29 | 0.06 | 0.90 | 0.29 | 0.06 | 0.90 | 0.29 | 0.06 |
| 12 | 0.03 | 0.45 | -0.02 | 0.02 | 0.77 | 0.40 | 0.02 | 0.77 | 0.40 | 0.02 | 0.77 | 0.40 |

**Correlation between 3-factor PEMA and Fluxomic data from on *Pichia Pastoris* simulated data**

| Simulated flux with out noise | Without noise | | | With 2% Error | | | With 5% Error | | | With 10% Error | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.20 | 0.57 | 0.80 | 0.05 | 0.80 | 0.57 | 0.87 | 0.05 | 0.57 | 0.87 | 0.45 | -0.08 |
| 2 | 1.00 | -0.06 | 0.35 | 0.93 | 0.55 | -0.06 | 0.30 | 0.93 | -0.06 | 0.30 | 0.48 | 0.91 |
| 3 | 0.34 | 0.44 | 0.98 | 0.23 | 0.68 | 0.44 | 0.76 | 0.23 | 0.44 | 0.76 | 0.45 | 0.08 |
| 4 | 0.12 | 0.77 | 0.71 | 0.08 | 0.62 | 0.77 | 0.69 | 0.08 | 0.77 | 0.69 | 0.62 | -0.08 |
| 5 | 1.00 | -0.04 | 0.37 | 0.93 | 0.56 | -0.04 | 0.31 | 0.93 | -0.04 | 0.31 | 0.49 | 0.90 |
| 6 | 0.33 | 0.48 | 0.98 | 0.24 | 0.64 | 0.48 | 0.72 | 0.24 | 0.48 | 0.72 | 0.49 | 0.08 |
| 7 | 0.25 | 0.29 | 0.80 | 0.00 | 0.92 | 0.29 | 0.97 | 0.00 | 0.29 | 0.97 | 0.21 | -0.07 |
| 8 | 1.00 | -0.05 | 0.36 | 0.93 | 0.56 | -0.05 | 0.31 | 0.93 | -0.05 | 0.31 | 0.49 | 0.90 |
| 9 | 0.30 | 0.55 | 0.94 | 0.26 | 0.56 | 0.55 | 0.64 | 0.26 | 0.55 | 0.64 | 0.55 | 0.09 |
| 10 | 0.15 | 0.73 | 0.74 | 0.08 | 0.67 | 0.73 | 0.75 | 0.08 | 0.73 | 0.75 | 0.58 | -0.08 |
| 11 | 0.99 | 0.03 | 0.35 | 0.96 | 0.49 | 0.03 | 0.25 | 0.96 | 0.03 | 0.25 | 0.57 | 0.91 |
| 12 | 0.33 | 0.45 | 0.98 | 0.23 | 0.67 | 0.45 | 0.75 | 0.23 | 0.45 | 0.75 | 0.46 | 0.08 |

**Table 3 : Here we calculate correlation of individual principal fluxes derived from PFMA and PEMA with cleaned fluxomic data. For both model we have considered first 3 principal fluxes. For noise-free fluxomic Data correlations between fluxes or pc's are similar. But with increase of noise in input fluxomic data PEM result deviates a lot and hence resultant principal fluxes remain no more correlated with noise-free fluxes. While the proposed PFMA able to find highly correlated principal fluxes from noisy fluxomic data .**

Correlation between  PFM and Fluxomic data

With 20% Error

| pc1 | pc2 | pc3 |
|---|---|---|
| -0.16 | 0.57 | 0.76 |
| 0.91 | 0.33 | 0.19 |
| 0.03 | 0.78 | 0.48 |
| -0.21 | 0.44 | 0.59 |
| 0.90 | 0.34 | 0.19 |
| 0.03 | 0.76 | 0.45 |
| -0.09 | 0.66 | 0.88 |
| 0.90 | 0.34 | 0.19 |
| 0.02 | 0.68 | 0.35 |
| -0.19 | 0.48 | 0.64 |
| 0.90 | 0.29 | 0.11 |
| 0.03 | 0.77 | 0.47 |

With 20% Error

| | | |
|---|---|---|
| 0.45 | 0.25 | 0.46 |
| 0.48 | 0.09 | 0.18 |
| 0.45 | 0.51 | 0.75 |
| 0.62 | 0.35 | 0.54 |
| 0.49 | 0.09 | 0.21 |
| 0.49 | 0.54 | 0.76 |
| 0.21 | 0.14 | 0.32 |
| 0.49 | 0.07 | 0.17 |
| 0.55 | 0.56 | 0.84 |
| 0.58 | 0.32 | 0.53 |
| 0.57 | 0.12 | 0.27 |
| 0.46 | 0.52 | 0.76 |

**A**