Spherical PCA

1) Take a look at the slides

(slide 20: summary)

2) Experiment 1 (code; synthetic data)

N: # of points

D: dim. of points

d: target dimension ($d \ll D$)

sigma: noise std

dist: dist. between estimated and true subspaces

; i.e., the output

For sigma: $0, 0.1, 0.2, \ldots, 1$

repeat the following experiments

2.1) Fix $d=1$, and vary D from 10 to 10^4, uniform on log scale, (10 pts)

→ i.e. $10^1, [10^{1.3}], [10^{1.6}], \ldots$

10^4

$N = 10^4$

2.2) repeat (1) w/ $N = 10^5$

$d = 10$, and D from 10^2 to 10^5.

2.3) Fix $D = 100$, $d = 10$

for $N = 10^1, 10^{1.3}, \ldots, 10^4$

(10 pts)

3.4) repeat (3) w/

$D = 1000$, $d = 100$

$N = 10^2, 10^{2.3}, \ldots, 10^5$

3.) Experiment 2 (code:

3.1) Reconstruction error)

Fix $N = 10^5$, $D = 100$

Vary d: $10^0, 10^{0.1}, \ldots, 10^1, \ldots, 10^2$

3.2.1 $N = 10^4$, $\theta = (0, 1)$

Vary $d = 1, 2, 3, \ldots, 9, 10$

BTW: change sigma for all of these.

3.1, 3.2 → report error

2's → report dist

Run EACH experiment 100 times and save ALL the results. SAVE Noise_M in experiment 2