Approximated PCA

Iteration 3

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Proposed hypothesis

Let ϵ_b be the error in the result with width b, then the following hypothesis can be proposed:

- The mean of $\mu = \log_2(\epsilon_b) \approx -b$.
- The standard deviation ≈ 2.

Mean

Let $X = \log_2(\epsilon_b)$ be a random variable with unknown mean μ and variance σ^2. Then, after k runs, the observed mean $\overline{x}$ follows (CLT):

$$\overline{X} \sim N(\mu, \sigma/\sqrt{k})$$

Or:

$$Z = \frac{\overline{X} - \mu}{\sigma/\sqrt{k}} \sim N(0, 1)$$

Mean

For any α, $0 < \alpha < 1$, let z_α be such that $P[Z > z_\alpha] = \alpha$
With probability $1 - \alpha$, the mean μ will lie in the region:

$$\overline{X} \pm z_{\alpha/2} S/\sqrt{n}$$

Plot of the mean

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