Exam CompStat: 26.7.17 16:00

July 18, 2017

- y_i, $\hat{y}$ RV
- $< y >= \mu_y$ not random $\rightarrow$ Prior

0.1 Basic Properties of random Variables

- Transitional, cond.prob., joint prob. margin

$$int(p(x,y),y) = f(x)$$

- law of error propagation

$$sig_y^2 = sig_x^2 * (dy/dx)^2$$
$$P(x|y) = P(x,y)/P(y)$$

0.2 Distributions

- uniform, binomial, poissonian, (multivariate-) gaussian, χ^2, exponential

$$f(x) > 0$$
$$\int f(x)dx = 1$$

- PDF

$$f(x)dx$$

- CDF

$$int(f(x), x, -Inf, y) = g(y)$$

- MGF

$$< e^{tx} >= \int e^{tx} f(x)dx$$

- moments

$$\int x^m f(x)dx$$
$$\int (x-\alpha)^m f(x)dx$$

0.3 Bayes Theorem

- <>

  P(d, t)

  G(x, mu) = exp(-.5*(x-mu)$^{2/\text{sig}}$2)

  P(D|T) = P(D,T)/P(T)

  P(T|D) = P(D,T)/P(D)

- frequentist

  P(D,T) = ...

  d_i, d_hat = sum(di, i)/N = f of data

  < d_hat > = mu

  -> PDF(theta_hat) (PDF of estimator)

- Bayes

  P(T|D) = P(D|T) * P(T)/P(D)

  E(D) = int(L(D|T)* pi(T), T)

  B_(AB) = E_A(D)/E_B(D)

0.4 Fisher Estimation

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F_( ,  ) = (dell^2 log(L))/(dell   _  * dell  _ ) @ maxL = (..)
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- we assume gaussian distr. params. around the peak for a found maximum likelihood estimator

  exp(-.5*(x_i- _i)* C_(i,j)^(-1)* (x_j- _j))

0.5 fitting

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t = f(x) = A_0 + A_1 * f_1(x) + A_2 * f_2(x)

exp(-.5* sum((d_i-t_i)^2/ _i^2))
-> C_(i,j)

A |_ maxL =G^-1 D, F_(\alpha, \beta) = G
```