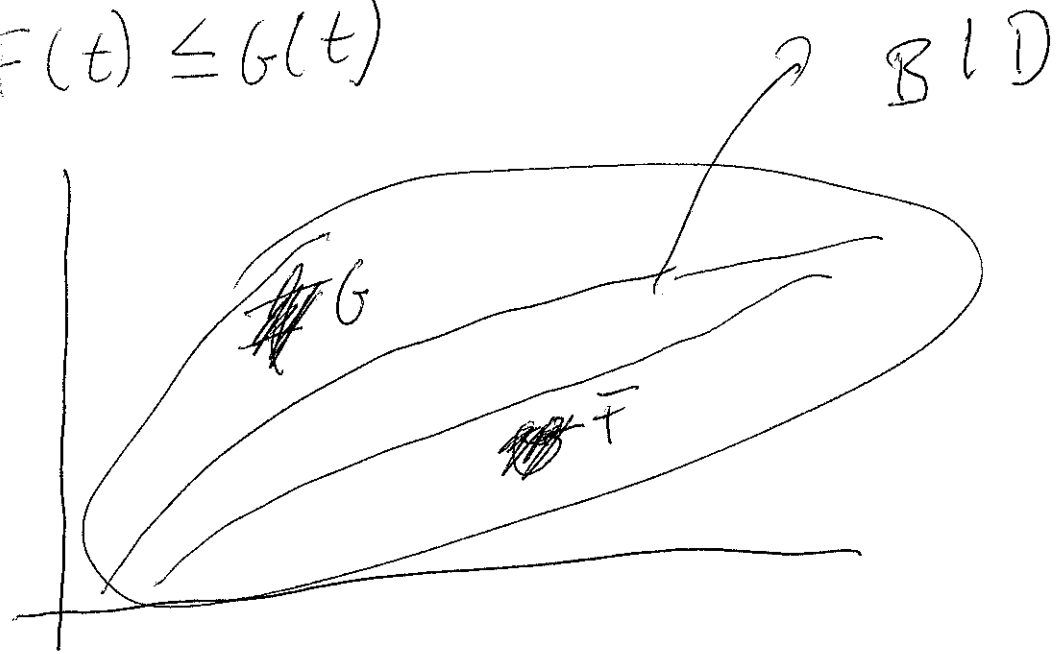
$F(t) \leq G(t)$



$\mu_F \quad \mu_G$

$\mu_F > \mu_G$

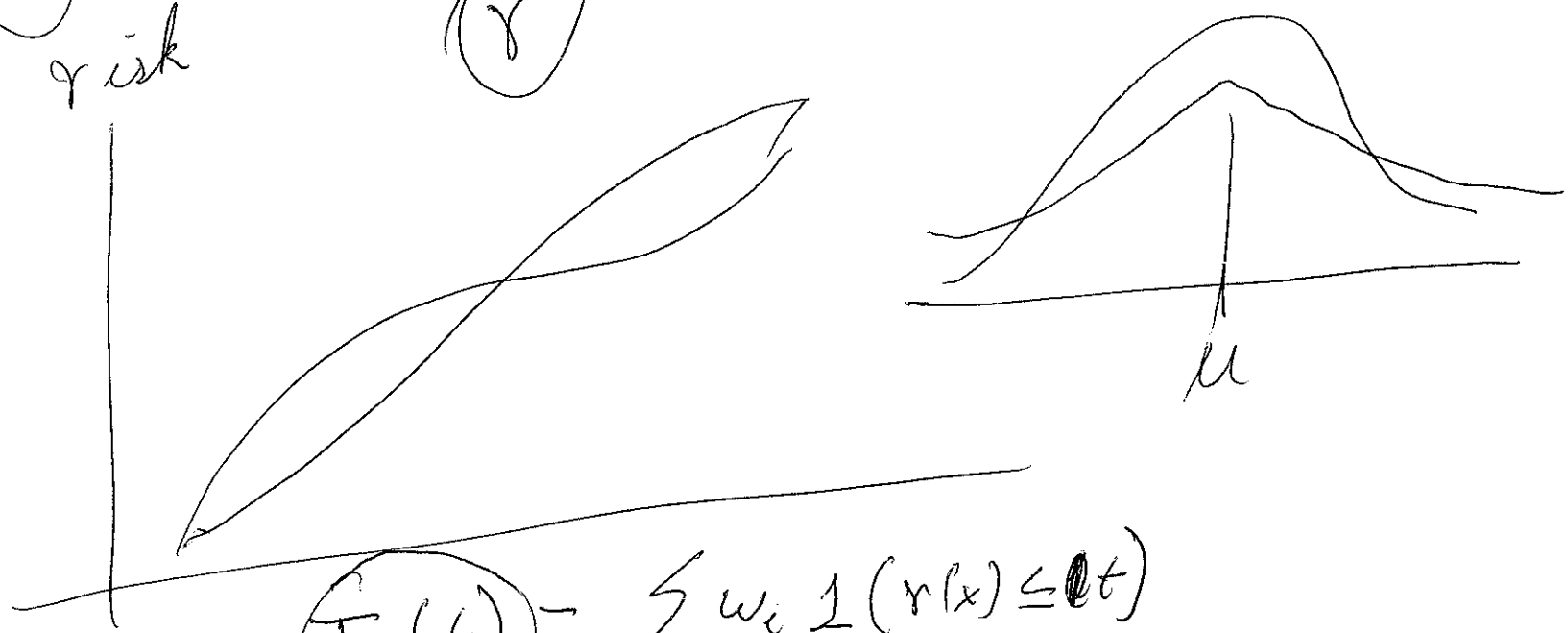
B I A

$\mu_F = \mu_0$

avg risk

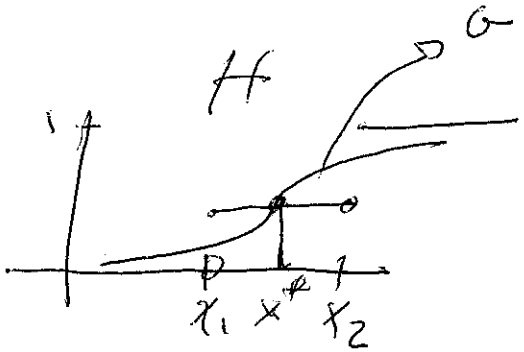
r

$\bar{r}_r$

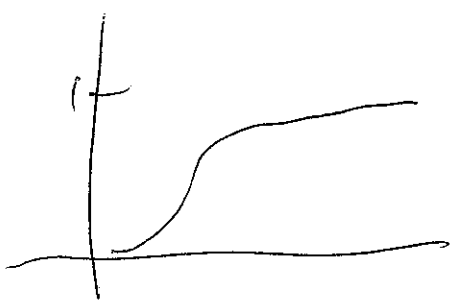


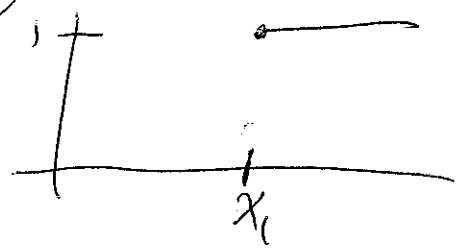
$$F_M(t) = \sum_x \omega_i \, 1(r(x) \le t)$$

x_1
x_2
x_3 $\longrightarrow$ $\bar{x}$



$G \longrightarrow$ F





$E_H(x^j) = \mu_j$

$j = 1, 2, 3$

$E_G(x) = \mu_1$

$E_G(x^2) = \mu_2$

$E_G(x^3) = \mu_3$

$Y \sim G$

$p($

$E_F(x) = \mu_1$

$x_1 = \mu_1$

$Y \sim G$ $\quad F = \delta_{x_1}$

$$P(|Y - x_1| > \varepsilon) \leq \frac{E(Y^2) - E_F(x^2)}{\varepsilon^2}$$

$$H = \alpha \delta_{x_1} + \bar{\alpha} \delta_{x_2}$$

$$P(|Y - x_1| \wedge |Y - x_2| > \varepsilon) \leq \frac{E(Y^4) - E_H(x^4)}{\varepsilon^4}$$

$$E_G(x^j) = E_F(x^j) \quad j = 1, 2, 3$$

N $\quad N = g\,n$

$N = 10000$

$n = 100 \rightarrow$ 6 points

11 moments

$2k-1 \rightarrow k$

$2k-1 < 2n$

x_1

$\vdots$

x_n

$E(x^i y^j)$

$\downarrow$

$k = ?$

$[a,b]$

$G \longrightarrow F = \delta_{x_1}$

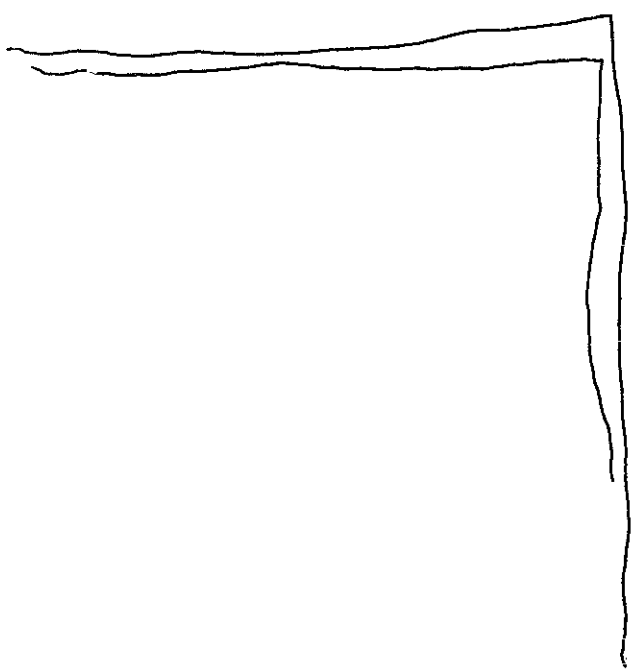
minimizes $E_F(X^2)$

$$F = \frac{x_1 - a}{b-a}\delta_b + \frac{b-x_1}{b-a}\delta_a$$

making $E_F(X^2)$

$Y \sim G$

$$P((b-Y)\mathbb{1}(Y-a) > \varepsilon) \leq \frac{E_F(X^2) - E(X)}{\varepsilon^2}$$



$2k-1$ moment

k-point $\quad a, b \notin S(F)$

$k+1$-point $\quad a, b \in S(F)$

$2k$

$$Q(x) = (x - x_1) \cdots (x - x_k)$$
$$= x^k + a_{k-1} x^{k-1} + \cdots + a_1 x + a_0$$

$$E(Q(x)) = 0$$

$$\mu_k + a_{k-1} \mu_{k-1} + \cdots + a_1 \mu_1 + a_0 = 0$$

$$= E(x^j Q(x)) = 0 \qquad \mu_{k+1} + a_{k-1} \mu_k + \cdots + a_1 \mu_2 + a_0 \mu_1 = 0$$

$j = 0, \ldots, k-1$

64 SIAM Golub WELSH

look it up!