UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION
INTERNATIONAL CENTRE FOR THEORETICAL PHYSICS
I.C.T.P., P.O. BOX 586, 34100 TRIESTE, ITALY, CABLE: CENTRATOM TRIESTE

H4.SMR/642 - 27

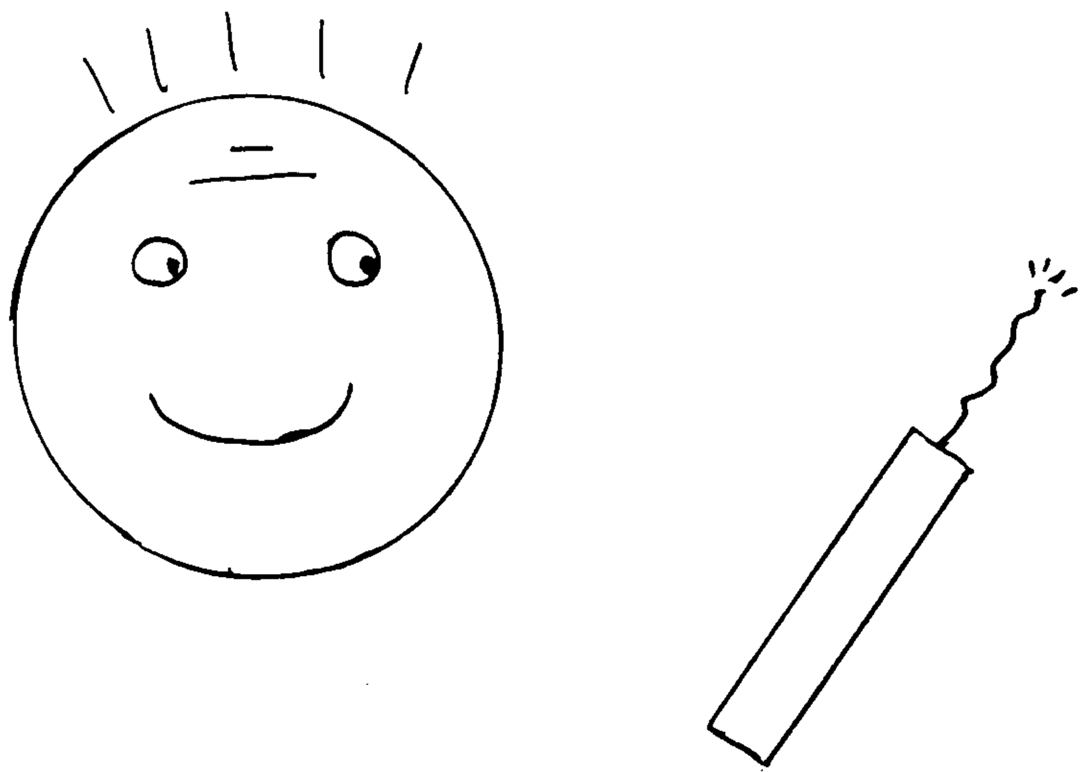
College on Methods and Experimental Techniques in Biophysics

28 September - 23 October 1992

Transparencies

H. FARACH
University of South Carolina, U.S.A.

These are preliminary lecture notes, intended only for distribution to participants.



$$\xi = \begin{pmatrix} x_1 & x_2 & \dots & x_n \\ p_1 & p_2 & \dots & p_n \end{pmatrix}$$

$$0 < y < 1$$

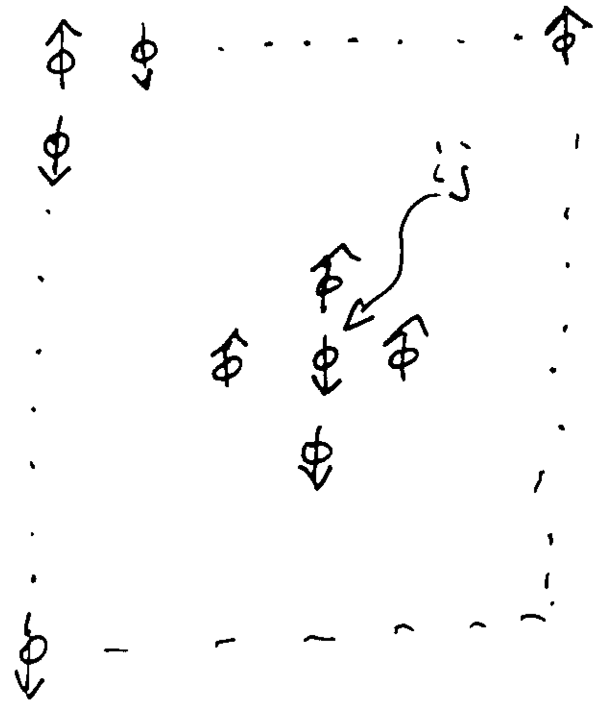
$$y = p_1,$$

$$y = p_1 + p_2$$

$$y = p_1 + p_2 + p_3,$$

$$y = p_1 + p_2 + \dots + p_{n-1}.$$

1



$10 \times 10 = 100$

$$E_{ij} = J\left(S_{ij}\left[S_{i,j+1} + S_{i+1,j} + S_{i,j-1} + S_{i-1,j}\right]\right)$$

Since $S_{ij} = \pm 1$

$$E_{ij} = J\left[-1 -1 -1 +1\right] = -2J$$

N° of ~~States~~ $2^{100} \sim 10^{30}$

$$\langle E \rangle = \sum E_i e^{-E_i/kT} / Z \longrightarrow 1\,\mu s$$

$$T = 10^{30} \times 10^{-6}\, s = 10^{24}\, s$$

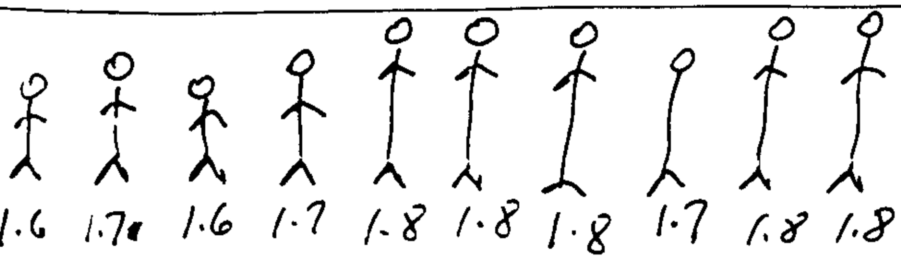
$= 10^{8}$ times $\times$ life of Univ !!

$$\langle E \rangle = \sum_i E_i \, e^{-E_i/kT} / Z$$

$$= \sum E_i \, p_i$$

$$p_i = e^{-E_i/kT} / Z$$

$$Z = \sum_i e^{-E_i/kT}$$



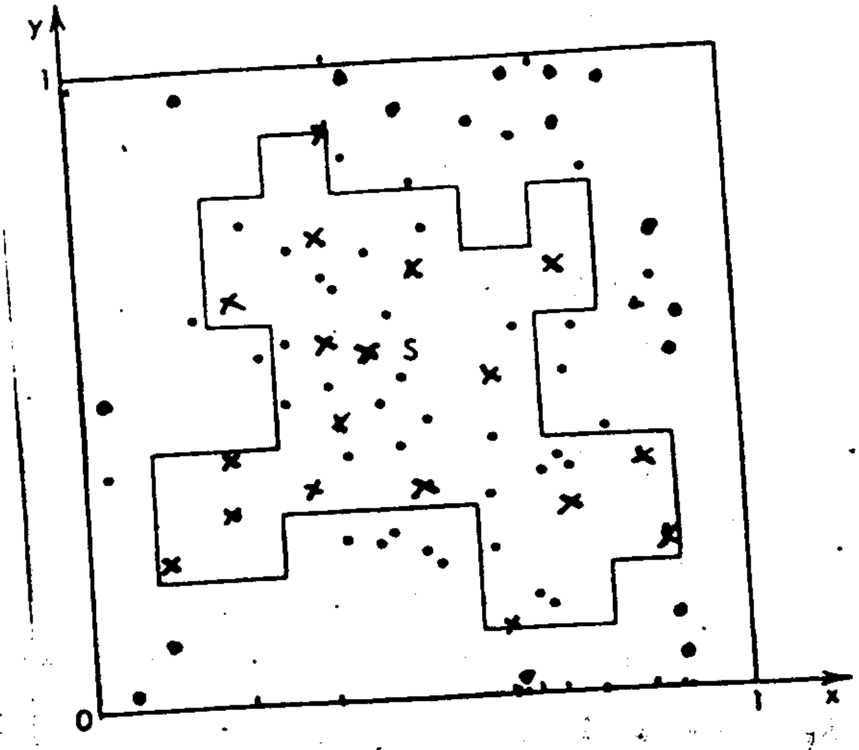
$$\langle h \rangle = 1.6 + 1.7 + 1.6 + 1.7 + 1.8 + 1.8 + 1.8 + 1.7 + 1.8 + 1.8 / 10$$

$$= 2 \times 1.6 + 3 \times 1.7 + 5 \times 1.8 / 10$$

$$= 1.6 \times 0.2 + 1.7 \times 0.3 + 1.8 \times 0.5$$

$$\langle h \rangle = \sum h_i \, p_i$$

$$p_i = \frac{n_i}{N} \qquad N = \sum n_i$$



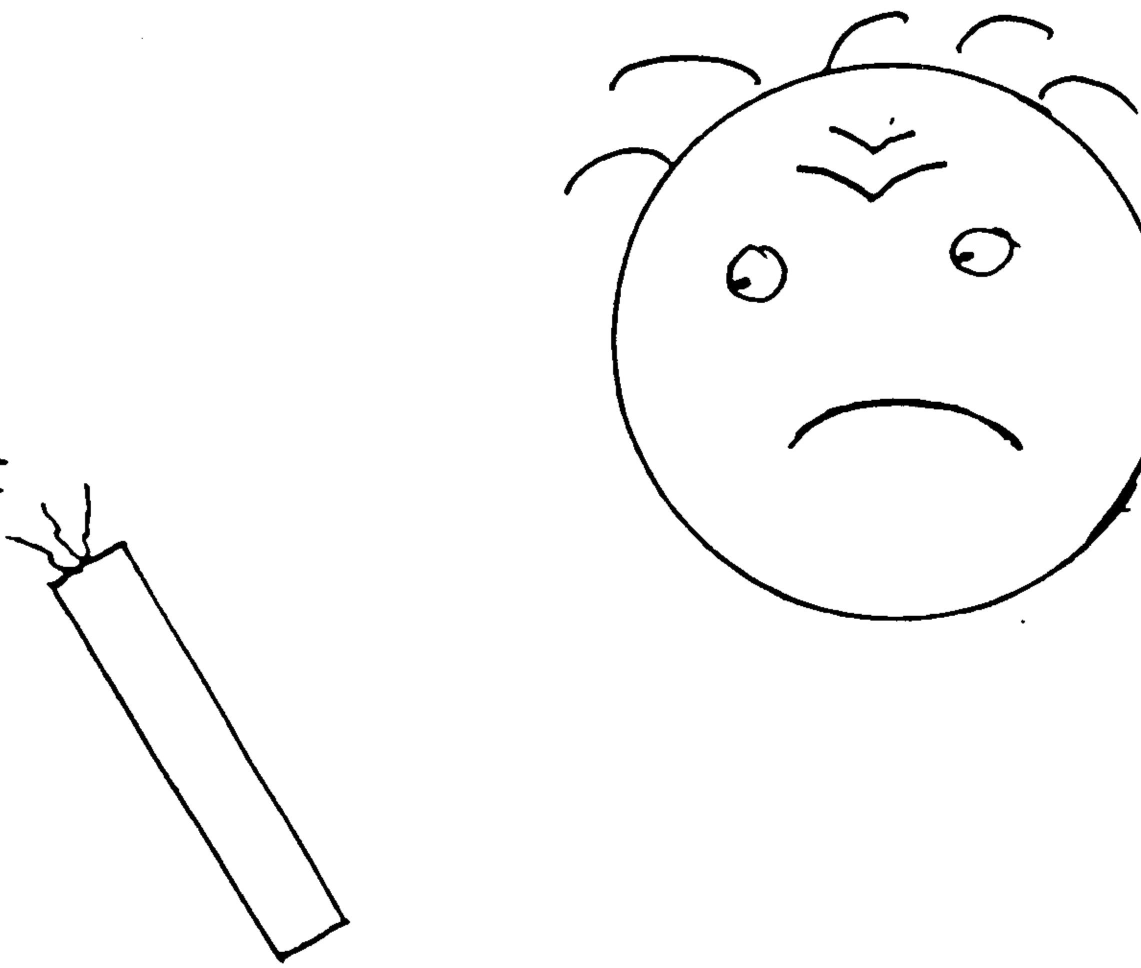
× 24

×+• 68

$$A \propto \frac{24}{68} = 0.41 \simeq 0.35$$

$$\text{Shotgun } \frac{24}{40} = 0.60 \neq 0.35$$

7

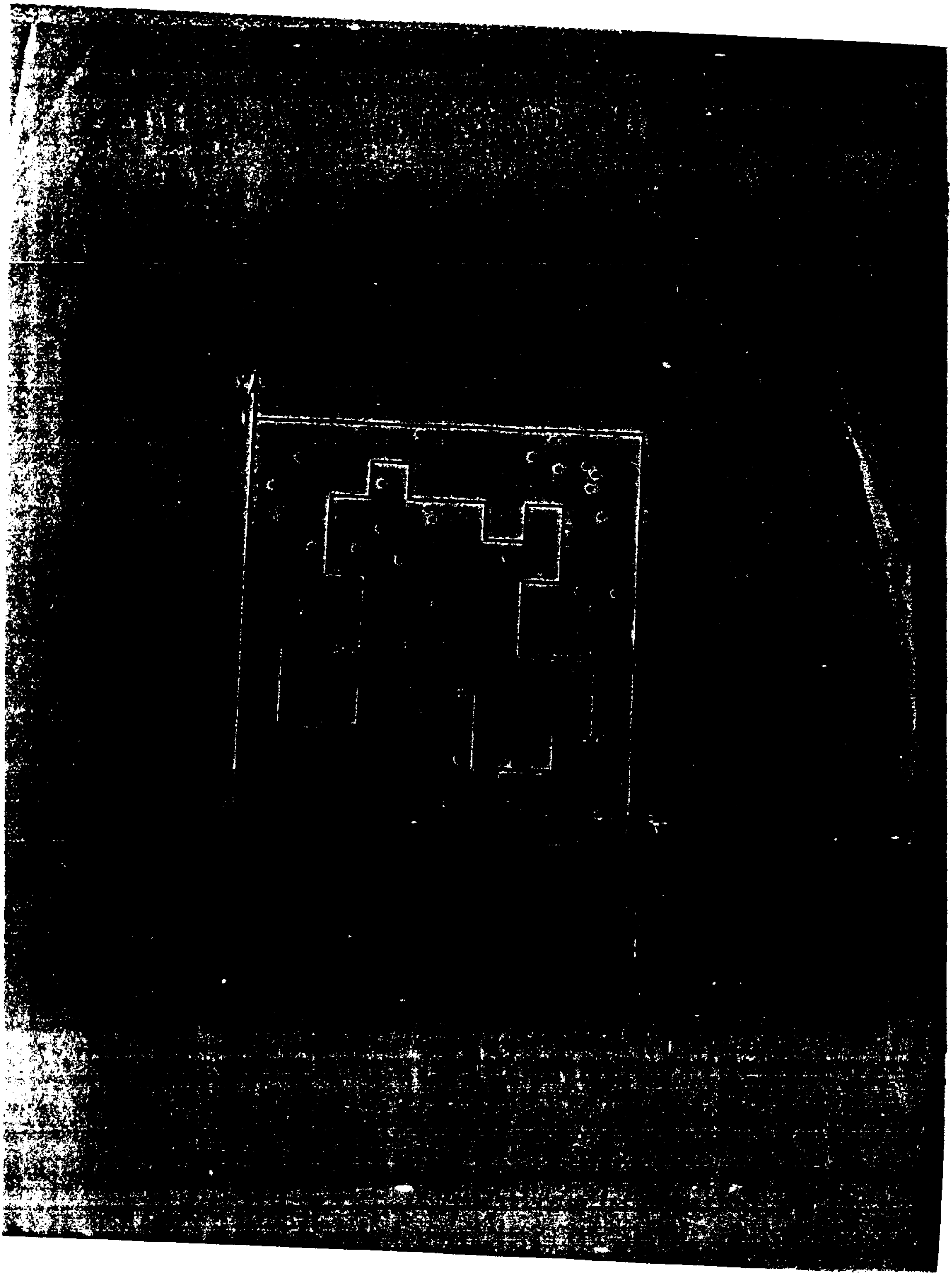


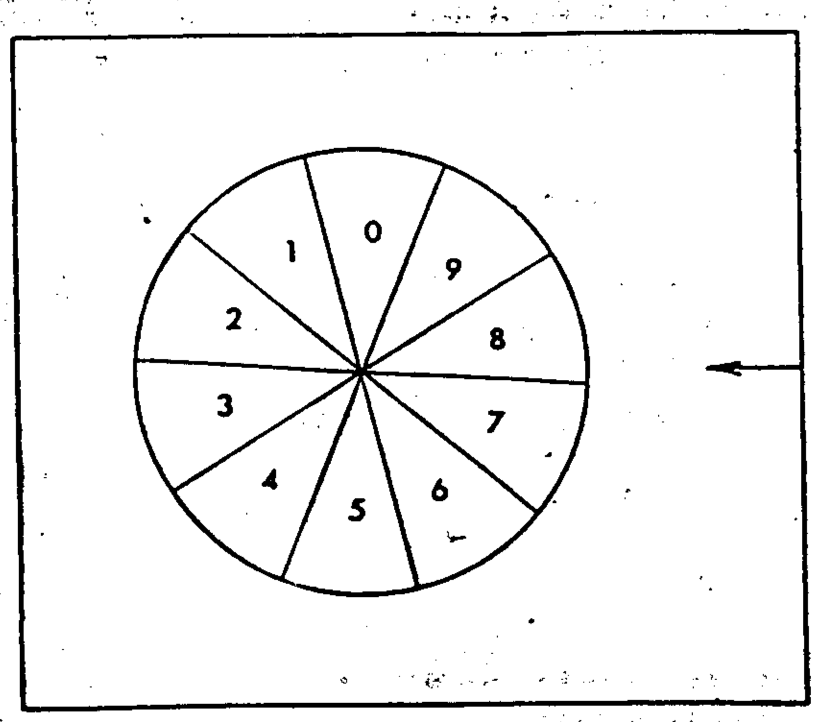
$$N = 40$$

$$N' = 12$$

$$N'/N = 12/40 = 0{,}30$$

$$S = 0{,}35$$




0
1
2
3
4
5
6
7
8
9

j	1	2	3	4	5	6	7	8	9	10
γ_j	0,865	0,159	0,079	0,566	0,155	0,664	0,345	0,655	0,812	0,332
ξ_j	1,461	0,626	0,742	1,182	0,618	1,280	0,923	1,271	1,415	0,905
$\dfrac{\operatorname{sen} \xi_j}{\xi_j}$	0,680	0,936	0,968	0,783	0,937	0,748	0,863	0,751	0,698	0,868

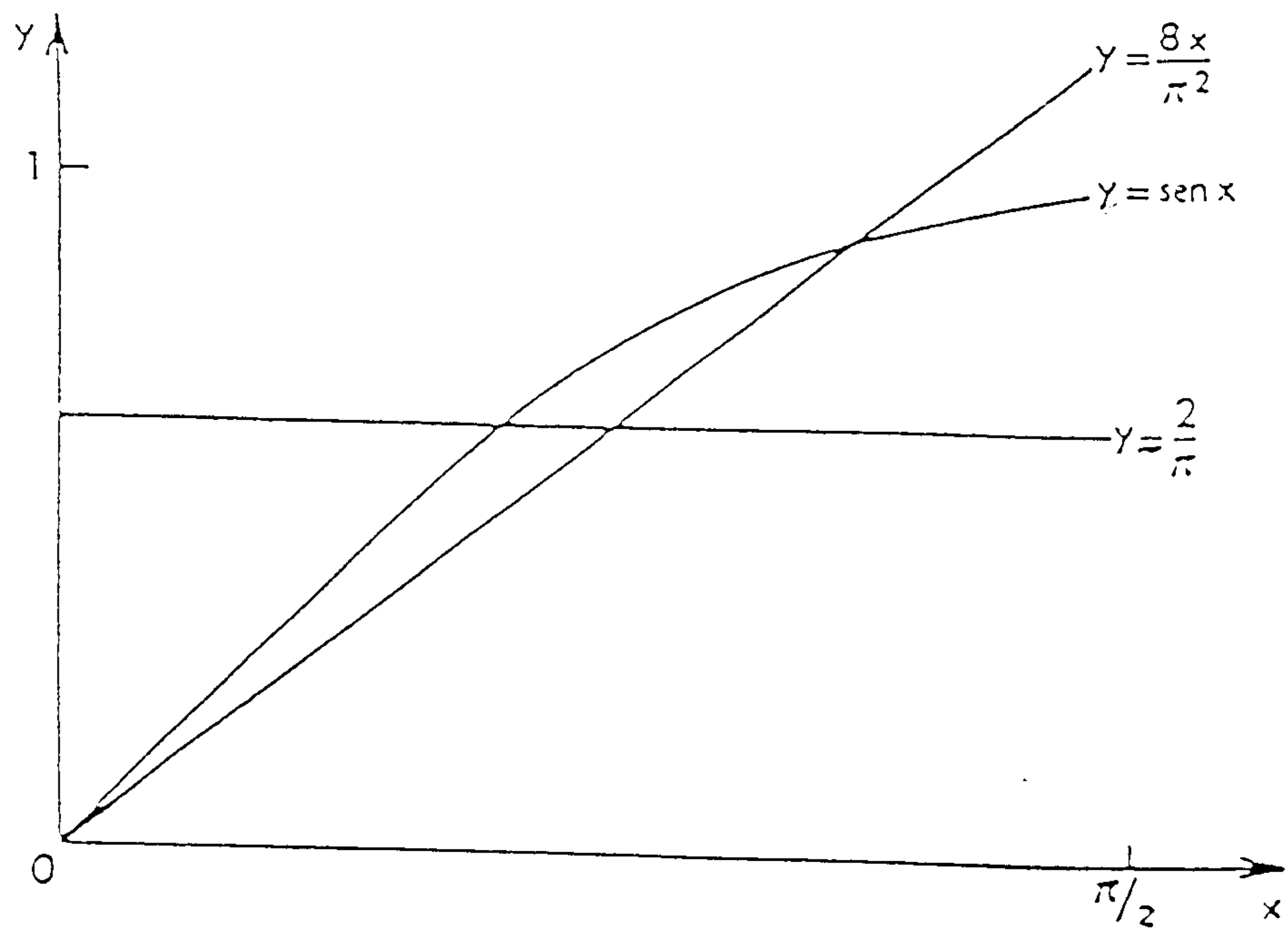
$$I \approx 1{,}016.$$

$$p_\xi(x) = 8x/\pi^2,$$

$$\int_0^\xi (8x/\pi^2)\, dx = \gamma;$$

$$\xi = \frac{\pi}{2}\sqrt{\gamma}.$$

$$I \approx \frac{\pi^2}{8N} \sum_{j=1}^{N} \frac{\operatorname{sen} \xi_j}{\xi_j}.$$



Y
1
$Y = \frac{8x}{\pi^2}$
$Y = \operatorname{sen} x$
$Y = \frac{2}{\pi}$
0
$\pi/2$
x

j	1	2	3	4	5	6	7	8	9	10
γ_j	0,865	0,159	0,079	0,566	0,155	0,664	0,345	0,655	0,812	0,332
ξ_j	1,359	0,250	0,124	0,889	0,243	1,043	0,542	1,029	1,275	0,521
sen ξ_j	0,978	0,247	0,124	0,776	0,241	0,864	0,516	0,857	0,957	0,498

$$I \approx 0{,}952.$$

$$I = \int_{0}^{\pi/2} \operatorname{sen} x \, dx$$

$$\int_{0}^{\pi/2} \operatorname{sen} x \, dx = [-\cos x]_{0}^{\pi/2} = 1$$

$$p_{\xi}(x) \equiv 2/\pi$$

$$p_{\xi}(x) = 8x/\pi^{2}$$

$$\xi = \pi\gamma/2.$$

$$I \approx \frac{\pi}{2N} \sum_{j=1}^{N} \operatorname{sen} \xi_j$$

$$a < x < b$$

$$I = \int_a^b g(x)\,dx$$

$$\eta = g(\xi)/p_\xi(\xi).$$

$$M\eta = \int_a^b [g(x)/p_\xi(x)]\,p_\xi(x)\,dx = I$$

$$1 - e^{-a\tau} = \gamma,$$

$$\tau = -\frac{1}{a} \ln (1 - \gamma).$$

$$\tau = -\frac{1}{a} \ln \gamma.$$

$$M\tau = \int_0^\infty xp(x)\,dx = \int_0^\infty xae^{-ax}\,dx$$

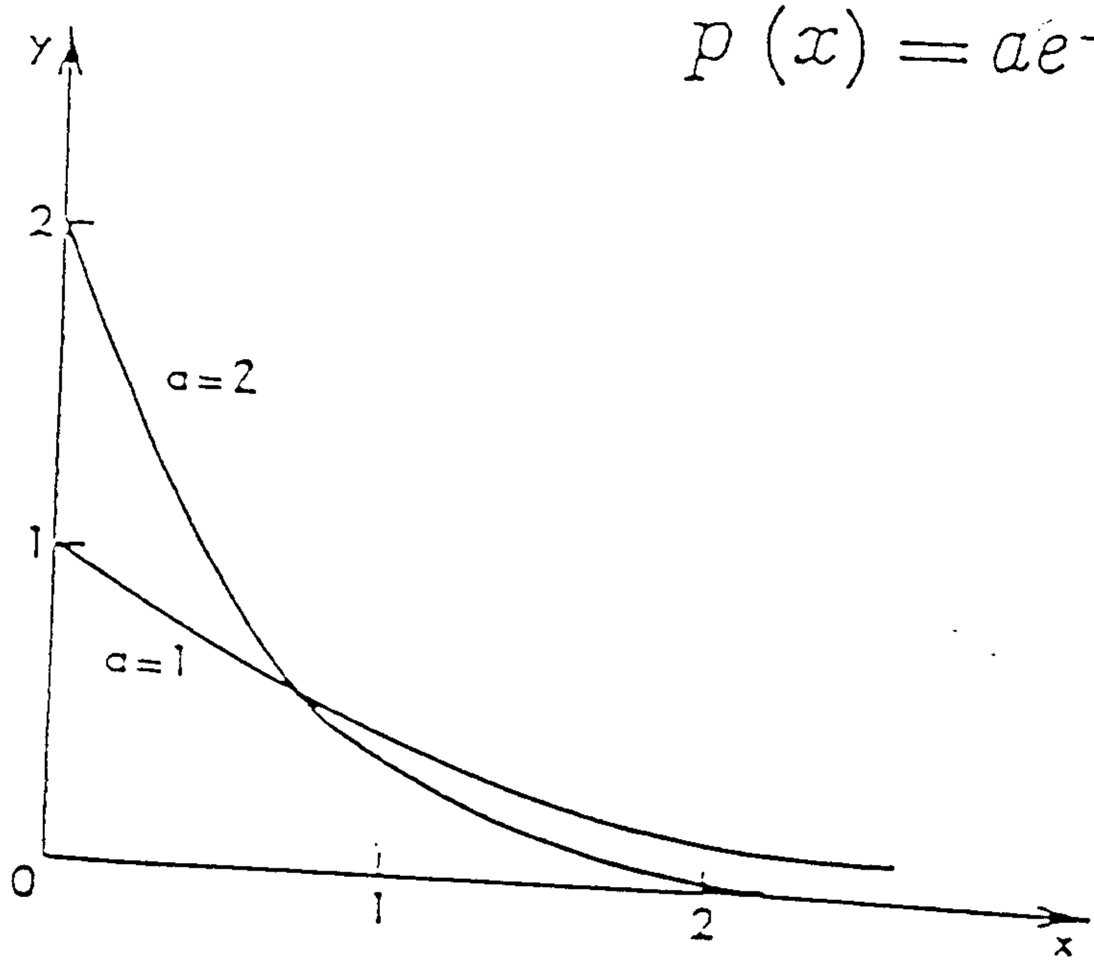
$$(u = x \text{ y } dv = ae^{-ax}dx)$$

$$M\tau = [-xe^{-ax}]_0^\infty + \int_0^\infty e^{-ax}\,dx$$

$$= \left[-\frac{e^{-ax}}{a}\right]_0^\infty = \frac{1}{a}$$

$$\int_0^\tau ae^{-ax}\,dx = \gamma$$

$$p(x) = ae^{-ax}$$



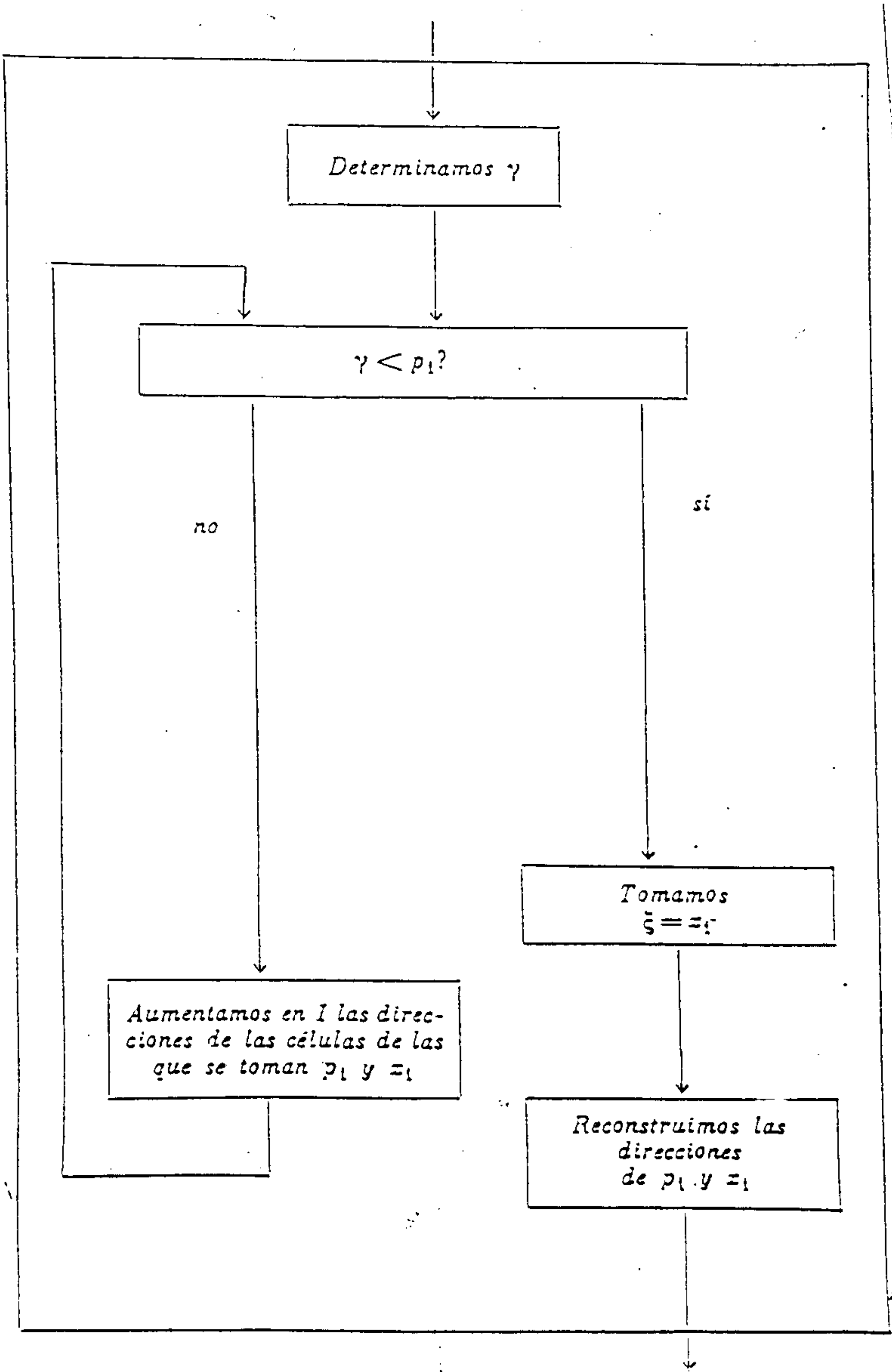
$$\int_a^{\xi} p(x)\, dx = \gamma$$

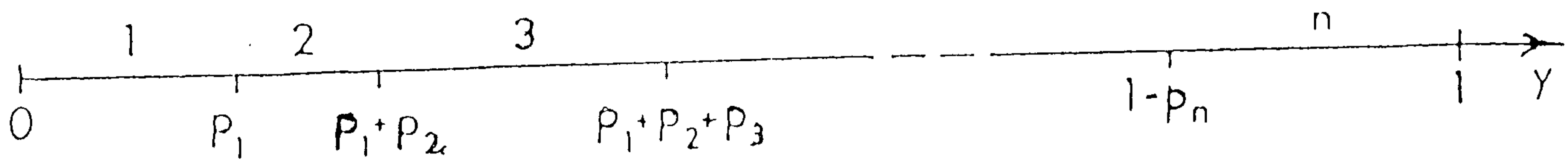
$$p(x) = \frac{1}{b-a} \qquad a < x < b$$

$$\int_a^{\eta} \frac{dx}{b-a} = \gamma$$

$$\frac{\eta - a}{b - a} = \gamma$$

$$\eta = a + \gamma\,(b - a)$$


Determinamos γ
$\gamma < p_1$?
no
sí
Tomamos $\xi = z_1$
Aumentamos en 1 las direcciones de las células de las que se toman p_1 y z_1
Reconstruimos las direcciones de p_1 y z_1



1
2
3
n
0
P1
P1+P2
P1+P2+P3
1-Pn
1
Y