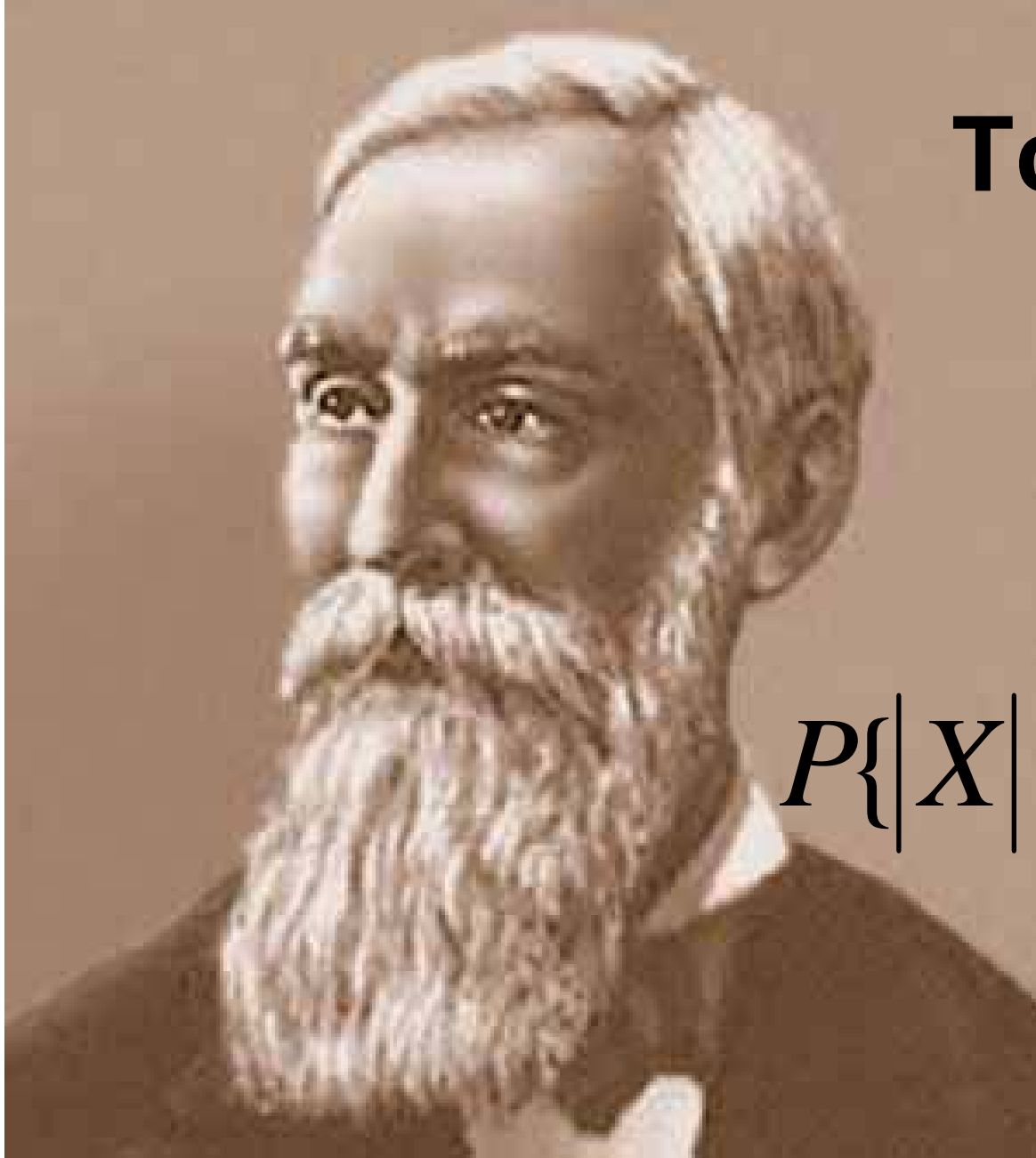


Generalized Tchebysheff's inequality to sedimentation

北京
二〇一七年十月十六日

**Problem of unknown
Distribution functions
in sedimentation**



Tchebysheff

$$P\{|X| \geq a_0\} \leq \frac{EX^2}{a_0^2}$$



**But, I. Bienaymé
has found this
inequality too. He
was first.**

I. Bienaymé



Kolmogorov

For an even

$$(f_1(-x) = f_1(x))$$

limited ($f_1(x) \leq K$),

non-negative and

non-decreasing

(under $x > 0$) function

found that

$$P\{|X| \geq a_0\} \geq \frac{Ef_1(X) - f_1(a_0)}{K}$$

Sokolov's Generalization of the Tchebysheff's inequality

$m < 0$ or $m > 0$

$$P\{X \in c\} \leq \frac{E\left[|Y(X)|^m\right] - \left[\inf_{\omega \in \Omega} |Y(X)|\right]^m}{\left[\inf_{\omega: X \in c} |Y(X)|\right]^m - \left[\inf_{\omega \in \Omega} |Y(X)|\right]^m}$$

Sokolov's Generalization of the Kolmogorov's estimation

$m < 0$ or $m > 0$

$$P\{X \in c\} \geq \frac{E\left[|Y(X)|^m\right] - \left[\sup_{\omega: X \notin c} |Y(X)|\right]^m}{\left[\sup_{\omega \in \Omega} |Y(X)|\right]^m - \left[\sup_{\omega: X \notin c} |Y(X)|\right]^m}$$

Attribute of
GENERALIZED INEQUALITIES

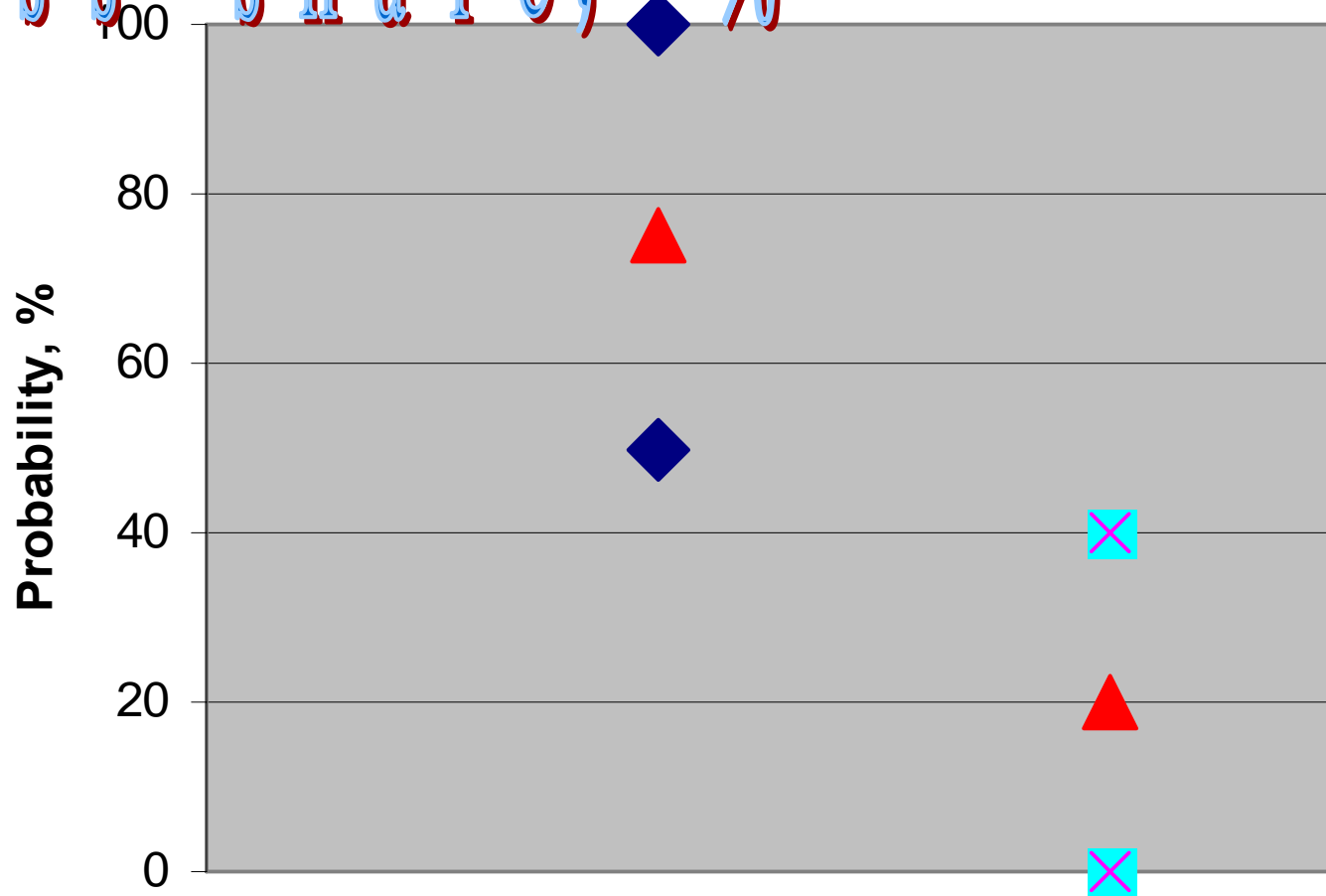
- GENERALIZED INEQUALITY IS KEPT UNDER REPLACE

ALL *sup* ON *inf*

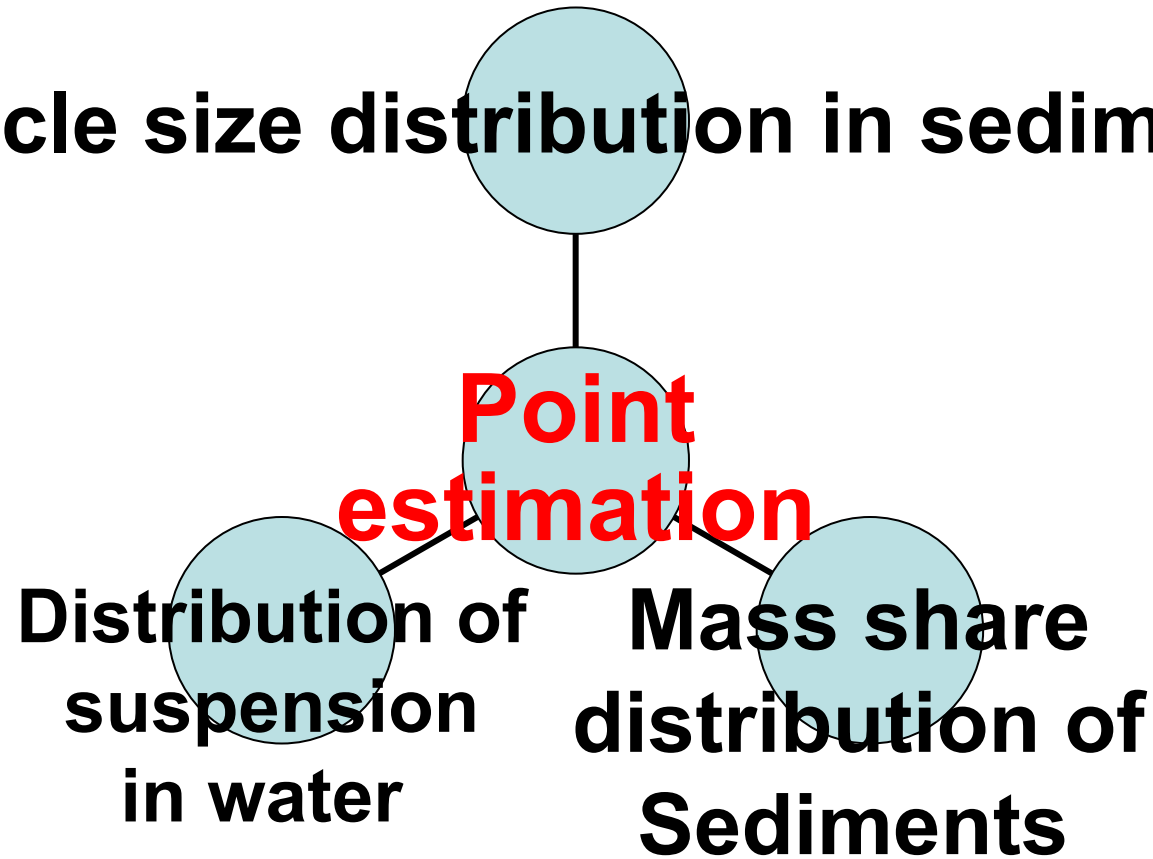
- GENERALIZED INEQUALITY IS KEPT UNDER REPLACE SIGN OF ALL EXPONENTS

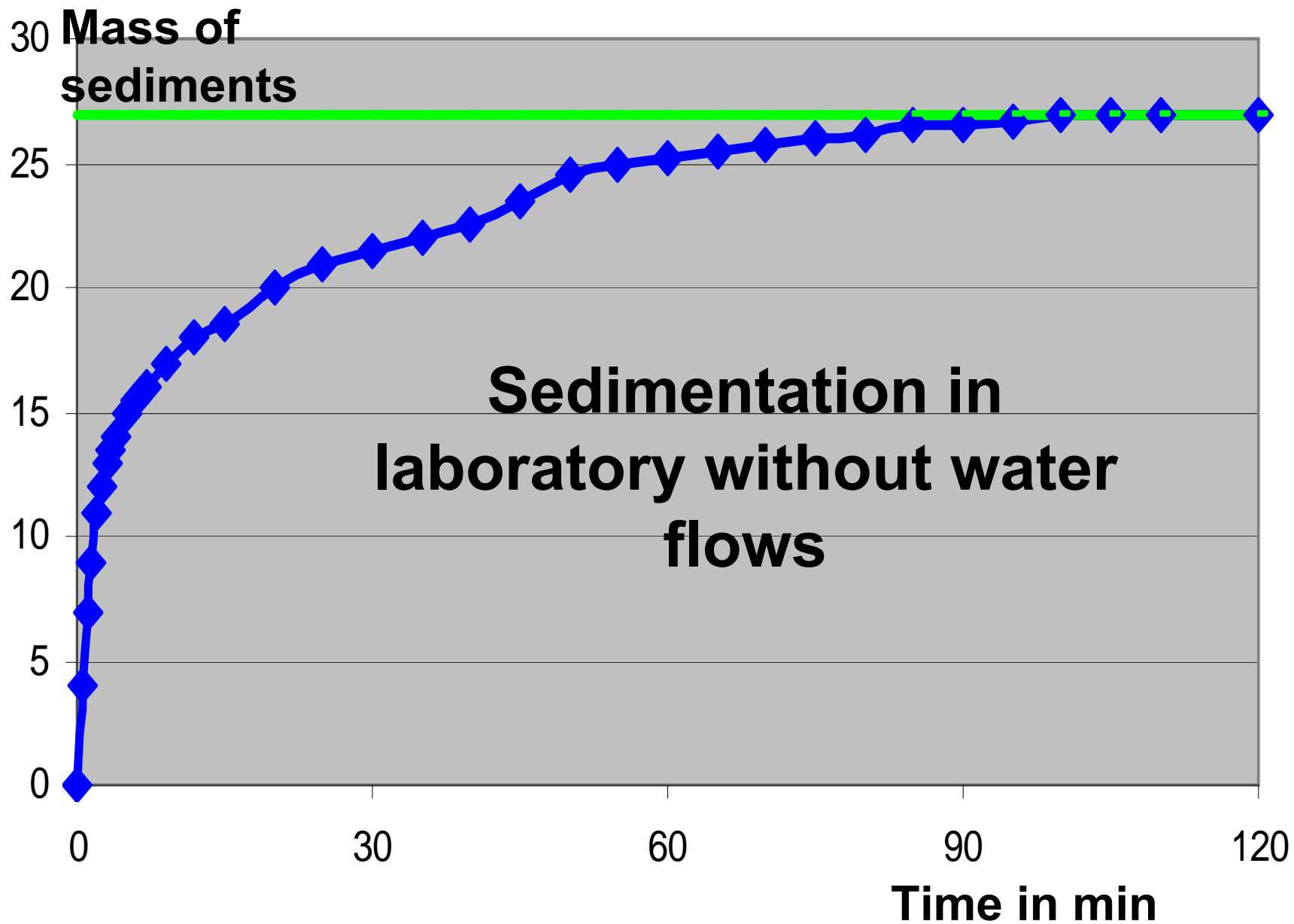
Idea of Point estimations

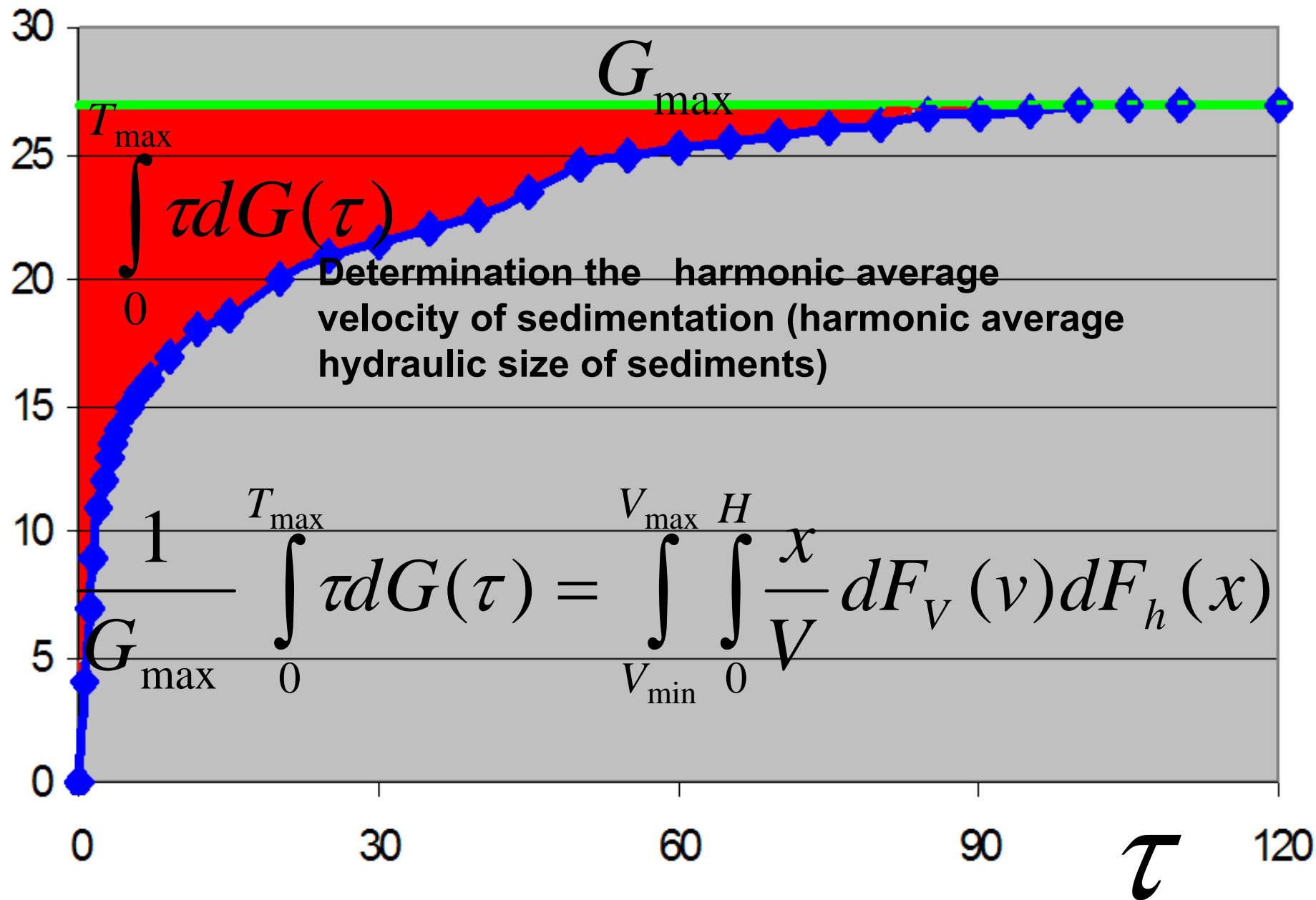
Mass share, %



Particle size distribution in sediments

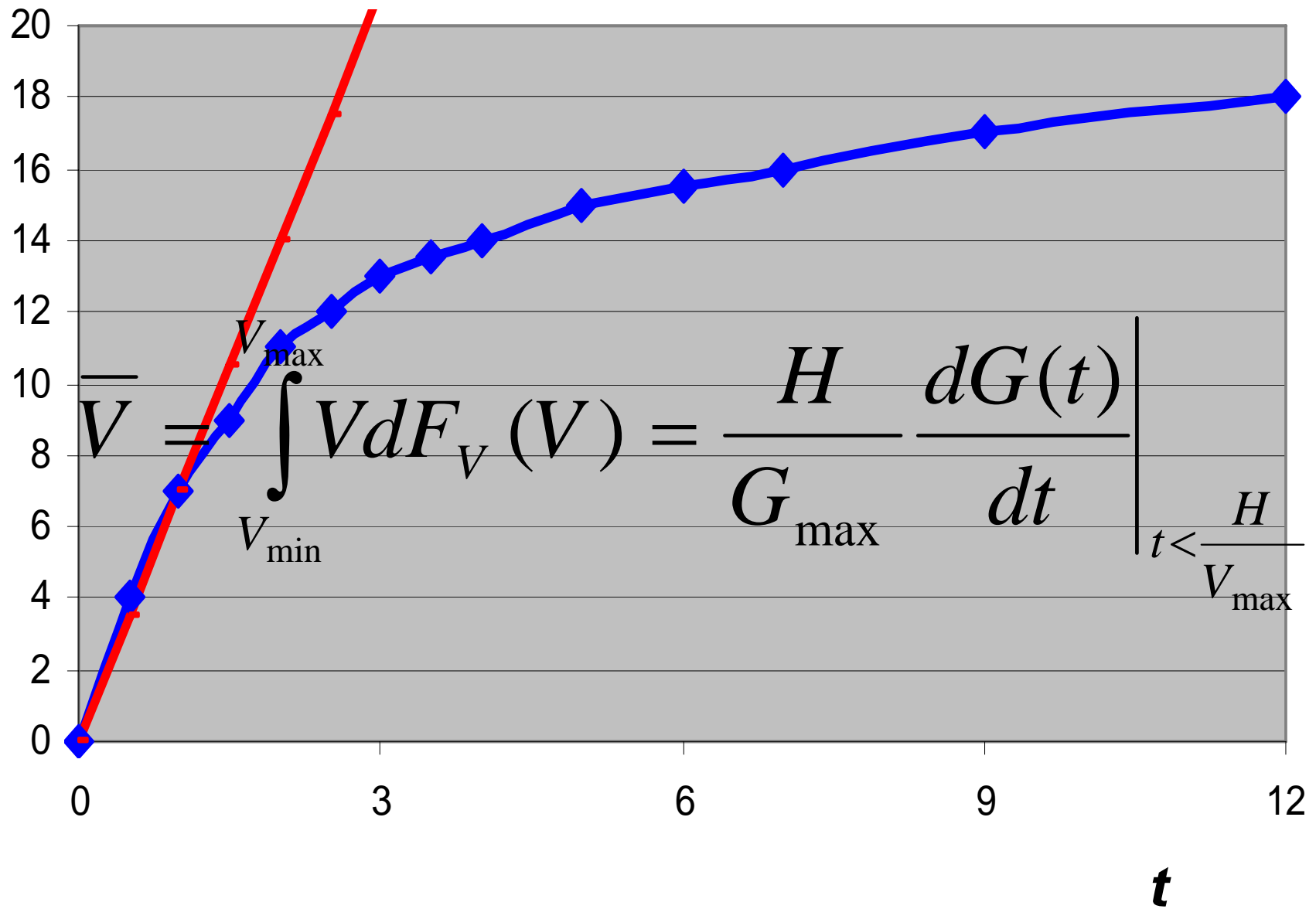






$$\overline{V^{-1}} = \frac{2}{HG_{\max}} \int_0^{T_{\max}} [G_{\max} - G(\tau)] d\tau$$

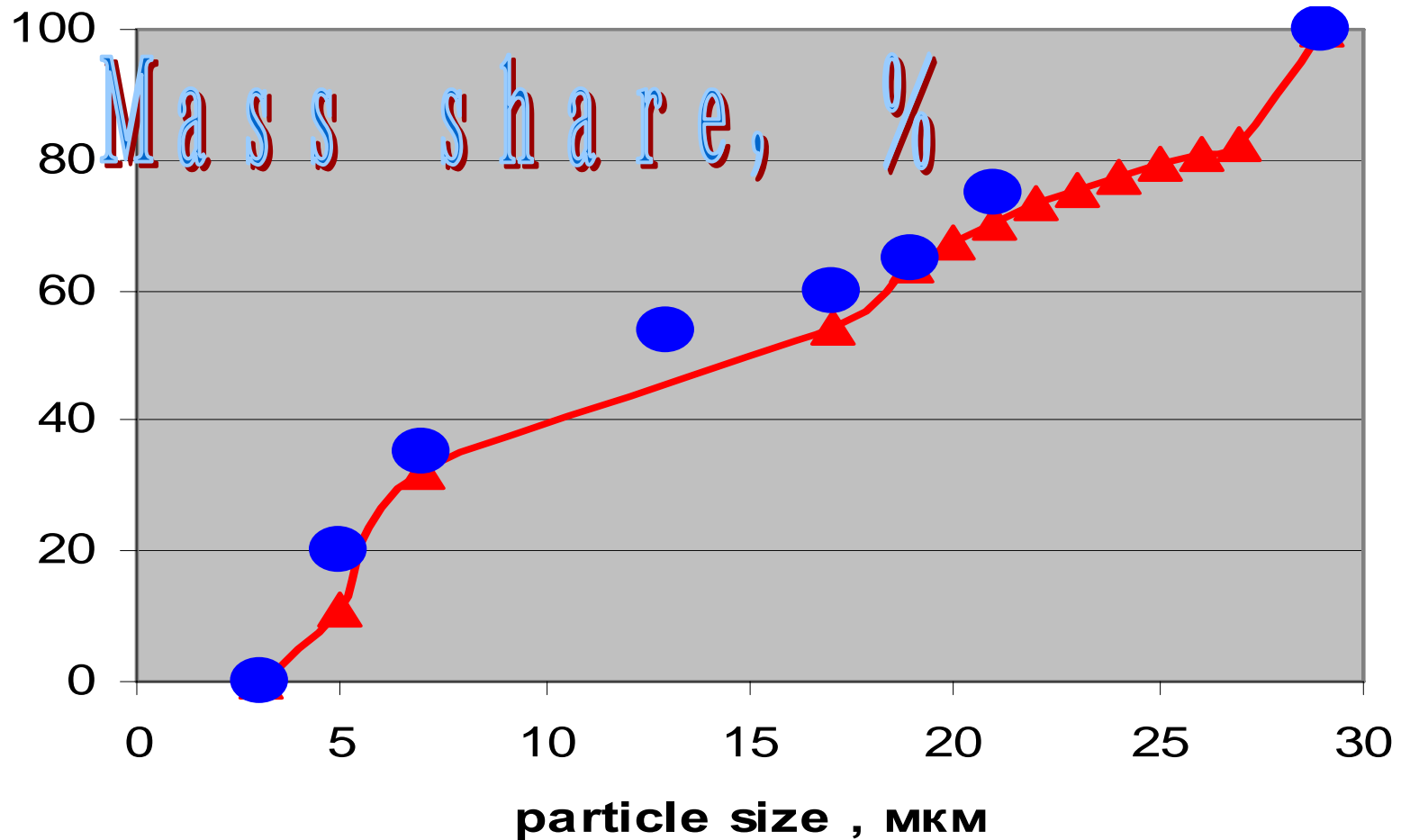
$$\overline{V^{-1}} = \int_{V_{\min}}^{V_{\max}} \frac{1}{V} dF_V (v)$$



harmonic average velocity of sedimentation	$\overline{V^{-1}}$	\overline{V}
$1.138 \cdot 10^{-4}$ m/c	8784.1 c/m	$7.2 \cdot 10^{-4}$ m/c

Point estimation

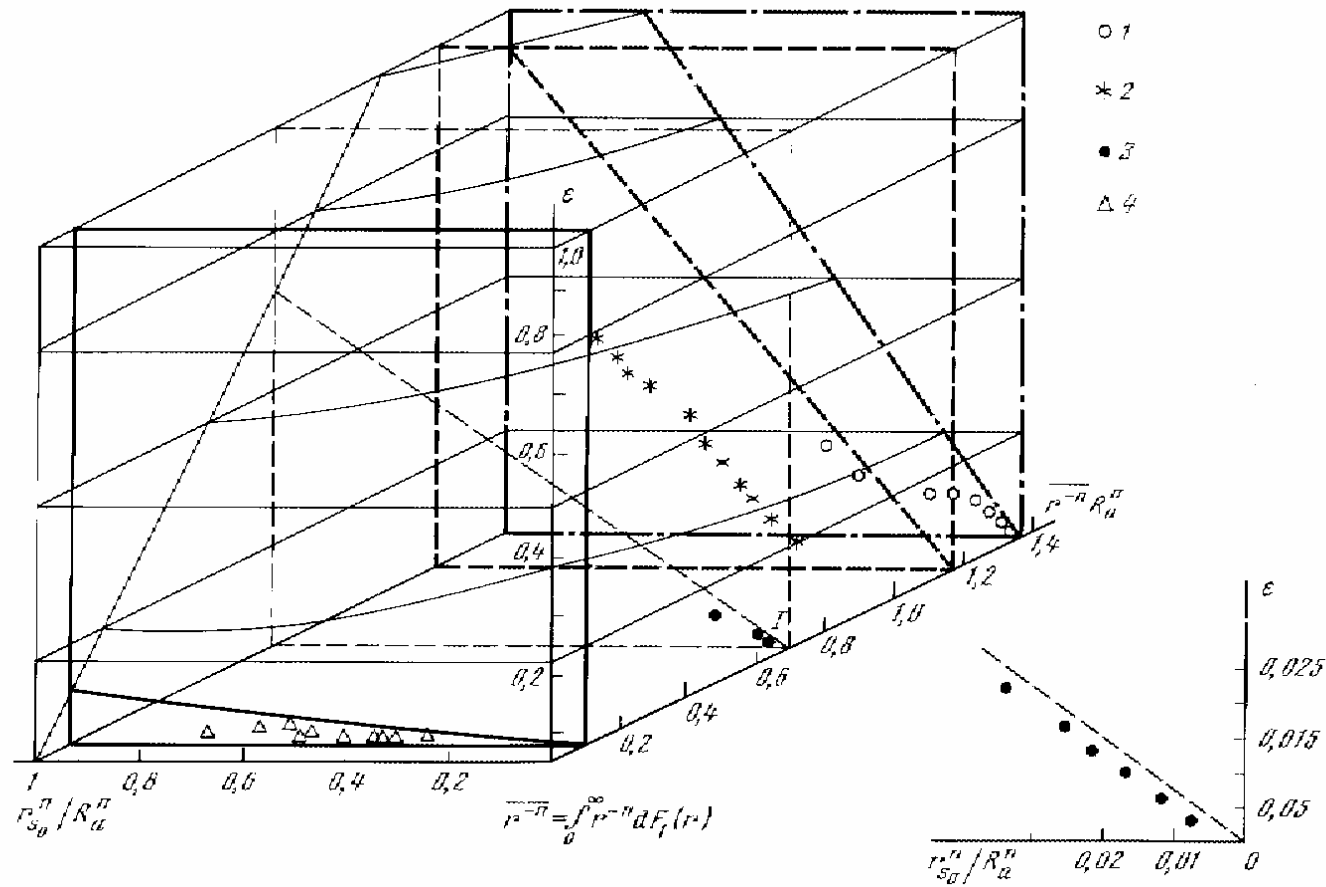
particle size distribution in sediments



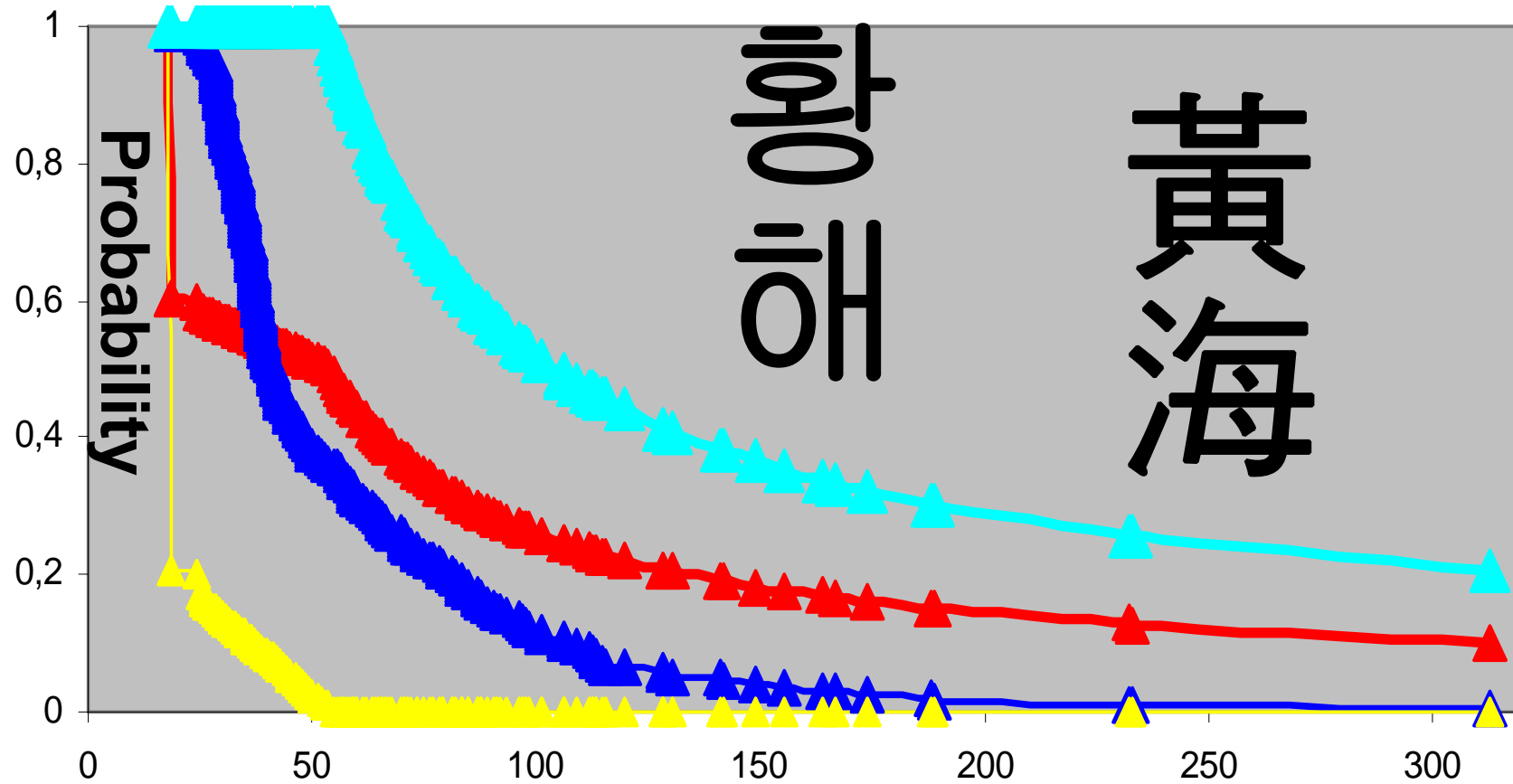
Direct Application to water flow
transportation of sediments with
unknown distribution, $n > 0$

$$\mathcal{E} \leq r_{s_0}^n \overline{r^{-n}}$$

Experimental modeling the sediment flow's transportation by centrifugal



Point estimations to concentration suspension in Yellow Sea (Incheon)



父



1913 - 2006

谢
谢

Thank you Спасибо

고맙습니다 Grazie あ

¡Gracias! Ευχαριστώ り

Merci 谢谢 شكراً が

Danke Obrigado Tack と

Kiitos תודה Dank u

Terima kasih う