

1

• Neighbor Method

X is the matrix of the coordinates of the starting points

$$X = \begin{pmatrix} \text{---} x_1 \text{---} \\ \text{---} x_2 \text{---} \\ \text{---} x_3 \text{---} \\ \text{---} x_{n+1} \text{---} \end{pmatrix} \quad \left. \vphantom{\begin{pmatrix} \text{---} x_1 \text{---} \\ \text{---} x_2 \text{---} \\ \text{---} x_3 \text{---} \\ \text{---} x_{n+1} \text{---} \end{pmatrix}} \right\} n+1 \quad X \in \mathbb{R}^{n+1, n+1} \quad \begin{pmatrix} x_1 - x_1 \\ x_2 - x_1 \\ \vdots \\ x_{n+1} - x_1 \end{pmatrix} \quad \left. \vphantom{\begin{pmatrix} x_1 - x_1 \\ x_2 - x_1 \\ \vdots \\ x_{n+1} - x_1 \end{pmatrix}} \right\} n$$

$$(f(x_1^{(n)}), f(x_2^{(n)}), \dots, f(x_{n+1}^{(n)})) = f\text{-evaluations} \quad \text{s.t.} \quad f(x_1^{(n)}) \leq f(x_2^{(n)}) \leq \dots \leq f(x_{n+1}^{(n)})$$

x - basic center = median i: total; part; quasi; pseudo; median; order

x_1	x_2	x_3	x_4		x_1	x_3	x_4	x_2	
1	2	3	4		1	3	4	2	

↑
new indices

$f(x_1) \leq f(x_3) \leq f(x_4)$
?
new indices [n+1]

$$\begin{pmatrix} \text{---} x_1 \text{---} \\ \text{---} x_2 \text{---} \\ \text{---} x_3 \text{---} \\ \text{---} x_4 \text{---} \end{pmatrix} \xrightarrow{x_1 \leftrightarrow x_2} \begin{pmatrix} \text{---} x_1 \text{---} \\ \text{---} x_2 \text{---} \\ \text{---} x_3 \text{---} \\ \text{---} x_4 \text{---} \end{pmatrix} \quad \text{OK} \quad \downarrow$$

x_1	x_3	x_4	x_2		x_1	x_3	x_4	x_2	
1	3	4	2		1	3	4	2	

2, but even x_1 can be
piv. (not too)

Initialization $f(x_1) \leq f(x_2) \leq f(x_3)$

quasi: original order; part; is; sub; total; can

$$\begin{pmatrix} x_1 & x_3 & x_4 & x_2 \end{pmatrix}^T \xrightarrow{\quad} \begin{pmatrix} x_1 & x_2 & x_3 & x_4 \end{pmatrix}^T \quad \text{3}$$

TEST

$$X = \begin{pmatrix} x_1 & x_2 \\ 2 & 3 \\ 4 & 1.5 \\ 5 & 10 \end{pmatrix} \quad \text{values-indices} \quad \begin{pmatrix} 11 & 1 \\ 10.5 & 2 \\ 22.9 & 2 \end{pmatrix} \quad \text{X-bricenter} \quad \begin{pmatrix} 3.5 & 6.5 \end{pmatrix}$$

$$X_r = (3.5 \ 6.5) + (3.5 \ 6.5) - (4 \ 1.5) = (3 \ -2) \checkmark$$

$$f - X_r = 2 + 1^2 = 3 \checkmark$$

$$\text{Si es posible } X_e = (3.5 \ 6.5) + 2[(3.5 \ 6.5) - (4 \ 1.5)] = (2.5 \ -10.5) \checkmark$$

$$X = \begin{pmatrix} 2 & 3 \\ 3 & -2 \\ 5 & 10 \end{pmatrix} \quad \text{values-indices} \quad \begin{pmatrix} 11 & 1 \\ 10.5 & 2 \\ 7 & 2 \end{pmatrix} \quad \begin{pmatrix} 7 & 2 \\ 11 & 1 \\ 10.5 & 3 \end{pmatrix}$$

$$X\text{-bricenter} = (2.5 \ 0.5) \checkmark$$

$$X_v = 0 \ -9 \checkmark \quad f - X_v = 11 \checkmark$$

$$X_c = (2.5 \ 0.5) - \frac{1}{2} (2.5 \ 0.5) + \frac{1}{2} (0 \ -9) = (1.25 \ 0.25) + (0 \ -4.5) = (1.25 \ -4.25) \checkmark$$

$$f(X_c) = 19.3125$$

$$X = \begin{pmatrix} 2 & 3 \\ 3 & -2 \\ 1.25 & 4.25 \end{pmatrix} \quad \text{values-indices} \quad \begin{pmatrix} 7 & 2 \\ 11 & 1 \\ 19.3125 & 3 \end{pmatrix}$$

expansion

contraction