

Collective learning ($n = 30$)

- of one common step size (\Rightarrow 1 step size):

$$f_1(\vec{x}) = \sum_{i=1}^n x_i^2$$

- of proper scalings (\Rightarrow n step sizes):

$$f_2(\vec{x}) = \sum_{i=1}^n i \cdot x_i^2$$

- of a metric (\Rightarrow correlated mutations):

$$f_3(\vec{x}) = \sum_{i=1}^n \left(\sum_{j=1}^i x_j \right)^2$$

(Schwefel, 1987) compares the progress rate for f_2 and a $(\mu, 100)$ -ES for

- optimum prefixed scaling, i.e., *perfect information* ($\sigma_i = c/\sqrt{i}$) (A),
- prefixed arbitrary scaling ($\sigma_i = c'$) (B),
- adaptive scaling (C).