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## SCE

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(CRR)

SCE-UA

SCE - :

(CRR)

CRR

CRR

CRR

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<sup>1</sup> Shuffled Complex Evolution



CRR

( ) ( ) ( ) ( )  
( ) ( ) ( ) ( )  
( ) ( )

CRR

NAM

SCE-UA

NAM

(Nitaya W. et al, 2001)

(-A)

(Q<sub>OF</sub>)

(Q<sub>BF</sub>)

(Q<sub>IF</sub>)

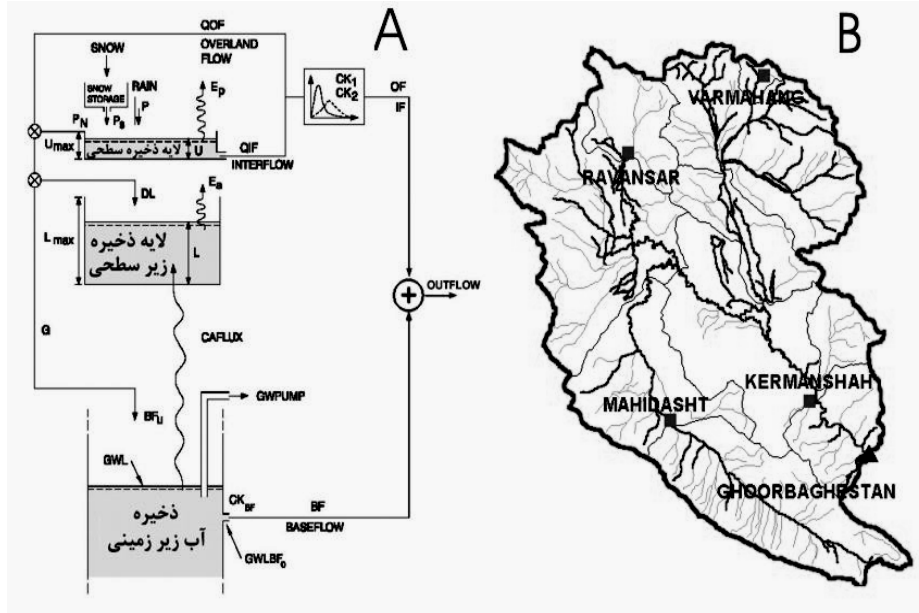
SCE-UA SA<sup>1</sup>GA

SCE

(Thyer et al, 1998)

SA GA

<sup>1</sup> Genetic Algorithm



NAM

- A :

- B

SCE

(SCE)

SCE

- :

- [Dixon and Szego, 1978 ; Torn and Zilinskas, 1989]

- [Becker and Iago, 1970 ; Torn 1978 ; Timmer, 1987]

[Holland, 1945]

- [Price, 1983 , 1987]

(Sorooshian et al,1993;

Duan ,1992,1993; Holland, 1975; Price,1978; Manetsch, 1990; Wang, 1991)

SCE-UA



<sup>1</sup>CCE SCE

SCE

( )

SCE

SCE

S

S

m

P

S

:

m

$A^1, A^2, \dots, A^P$ ,

$$A^x = \{X_j^x, f_j^x | X_j^x = X_x + P(j-1)f_j^x = f_x + P(j-1), j=1, \dots, m\}$$

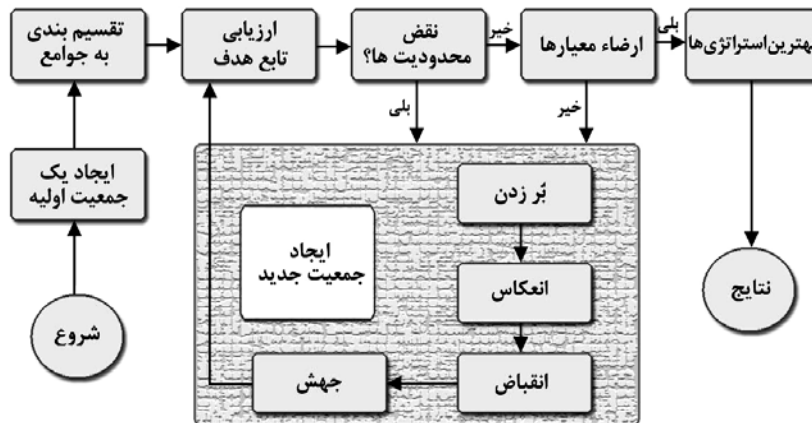
(CCE)

$A^K, K=1, 2, \dots, P$

$$D = \{A^x, x=1, 2, \dots, P\}$$

$A^1, A^2, \dots, A^P$  :

D



SCE

:

<sup>1</sup> Competitive Complex Evolution



(CCE)

SCE

CCE

$\mathbf{q}$

$q$

$$B = \{u_i, v_i, i = 1, \dots, g\}$$

$v_i$

$B$

$A^k$

$L$

$u_i$

$L$

$B$

( ) :

$$g = \left[ \frac{1}{(q-1)} \sum_{j=1}^{q-1} u_j \right]$$

( )

$$r = 2g - u_q$$

( )

$f_r$

$A^k$

$H \in \mathbb{R}^n$

$$f_r \quad r = z$$

$f_z$

$H$

$Z$

$f_r < f_q$

( ) ( )

$$f_r = f_z$$

$f_z$

$$c = (g + u_q) / 2$$

$C \quad f_c < f_q$

( )

$f_z \quad H$

$Z$

( )

$z$

$\infty$

( )

( )

( )

( )

$u_q$

$Z$

$$\infty \geq 1$$



$\beta \geq 1.$

$\beta$

-

SCE

SCE

CCE

CCE

CCE

CRR

SCE

( )

Duan

SCE

(2004)

Liong

SCE

S

NF

(AFE)



( )

Duan

Liong et al(2004) al(1993)

(mm) (dc) (mm)

(cms)

(1-B)

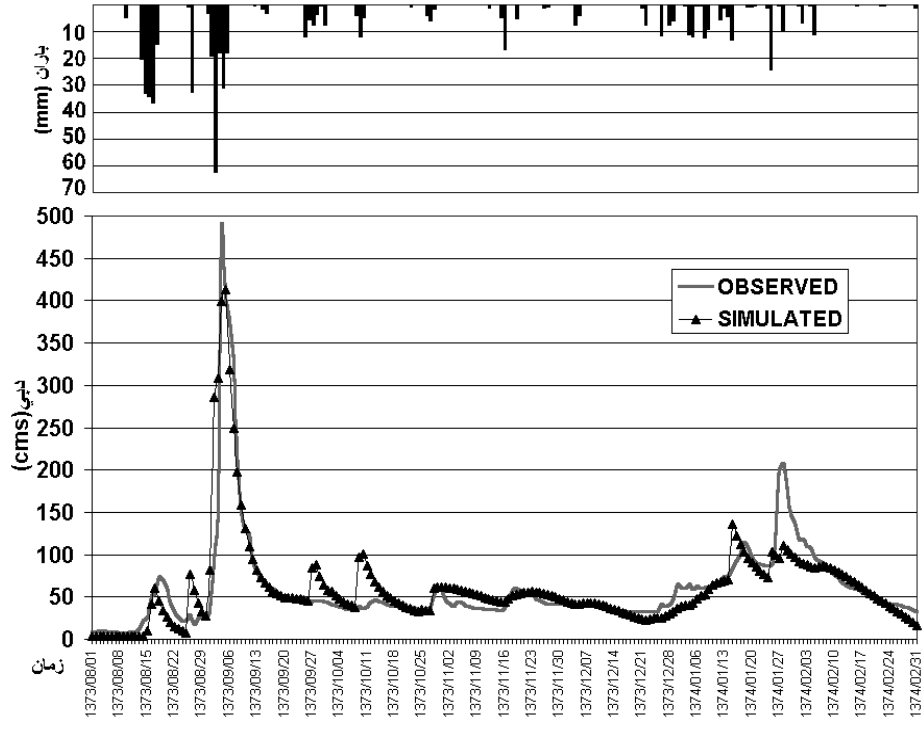
( ) NAM

( )

CURRENT MODEL		SCE-UA (Duan et al,1993)		FD-CCD (Liong et al, 2004)				
AFE	NF	AFE	NF	AFE**	*NF			
								Goldstien-Price
								Rosenbrock
								Six-hump Camelback
								Rastrigin
								McCormic
								Griewank
								Shekel
								Griewank

:NF

:AFE



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