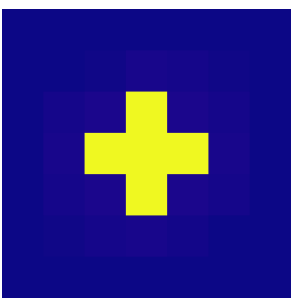
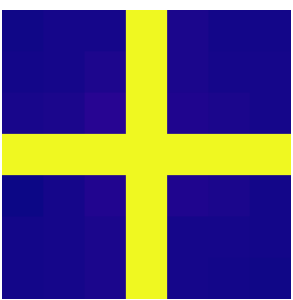


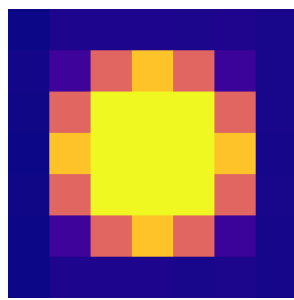
Opération : **ouverture**
Jeu : **MNIST**



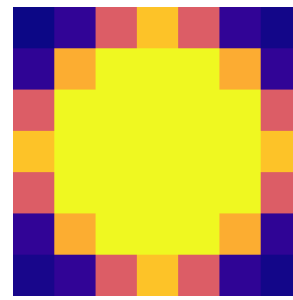
cross3



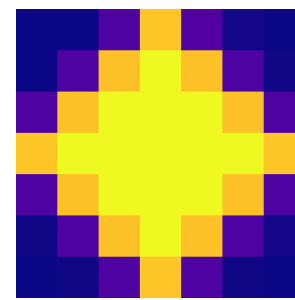
cross7



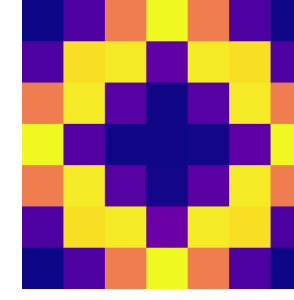
disk2



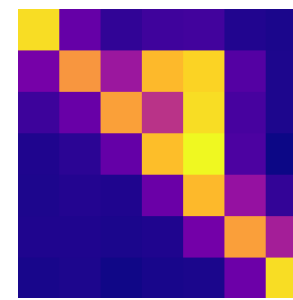
disk3



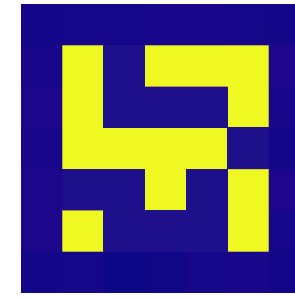
diamond3



complex



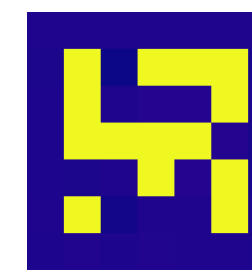
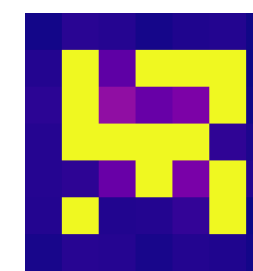
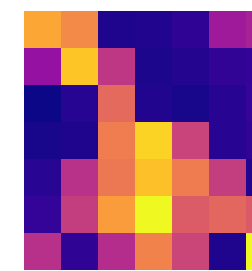
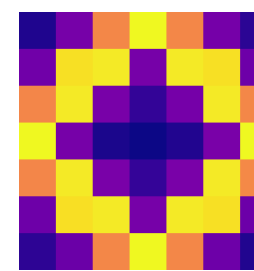
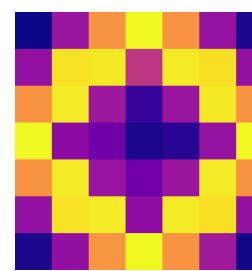
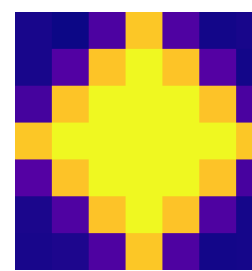
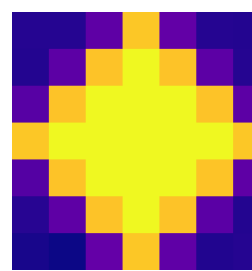
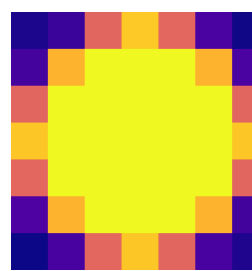
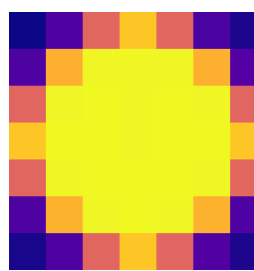
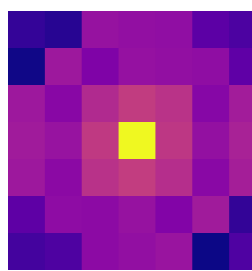
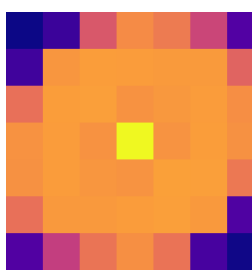
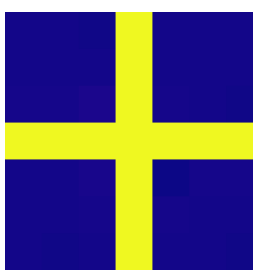
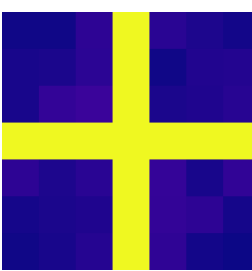
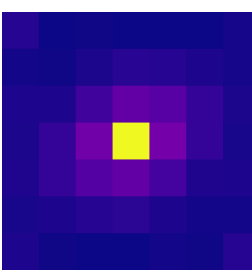
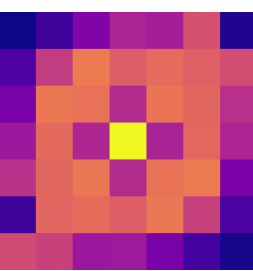
adiag



brand

SMorph

w_1/w_2



α_1

-0.47 ± 0.002

-29.73 ± 0.05

-0.93 ± 0.003

-34.45 ± 0.03

-45.35 ± 0.02

-21.65 ± 0.04

-3.00 ± 0.12

-30.03 ± 0.05

α_2

-4.93 ± 0.008

47.32 ± 0.02

-0.54 ± 0.004

52.66 ± 0.02

54.50 ± 0.03

17.02 ± 0.02

-0.29 ± 0.01

49.48 ± 0.02

RMSE₁

$0.48 \pm 1 \times 10^{-3}$

$0.03 \pm 4 \times 10^{-3}$

$0.43 \pm 4 \times 10^{-4}$

$0.01 \pm 5 \times 10^{-3}$

$0.02 \pm 3 \times 10^{-3}$

$0.12 \pm 4 \times 10^{-3}$

$0.43 \pm 2 \times 10^{-2}$

$0.09 \pm 5 \times 10^{-3}$

RMSE₂

$0.23 \pm 9 \times 10^{-4}$

$0.01 \pm 4 \times 10^{-3}$

$0.35 \pm 2 \times 10^{-3}$

$0.01 \pm 2 \times 10^{-3}$

$0.01 \pm 2 \times 10^{-3}$

$0.05 \pm 9 \times 10^{-3}$

$0.40 \pm 3 \times 10^{-3}$

$0.02 \pm 7 \times 10^{-3}$

LOSS

$4.7 \times 10^{-3} \pm 4 \times 10^{-5}$

$2.2 \times 10^{-6} \pm 1 \times 10^{-6}$

$3.4 \times 10^{-3} \pm 6 \times 10^{-5}$

$1.9 \times 10^{-6} \pm 1 \times 10^{-6}$

$1.7 \times 10^{-6} \pm 5 \times 10^{-7}$

$8.0 \times 10^{-6} \pm 2 \times 10^{-6}$

$1.5 \times 10^{-3} \pm 3 \times 10^{-5}$

$2.0 \times 10^{-6} \pm 7 \times 10^{-7}$

EPOCHS

25 ± 5

32 ± 4

27 ± 4

38 ± 4

36 ± 2

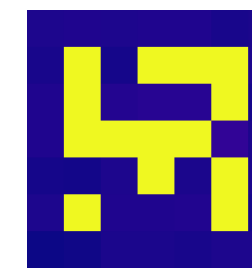
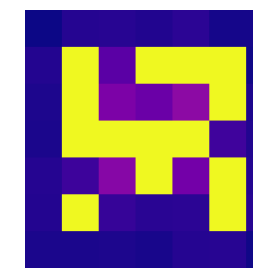
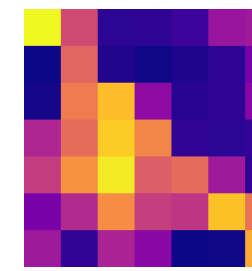
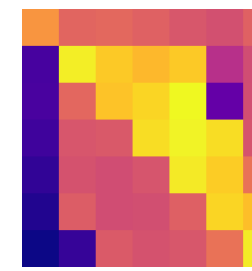
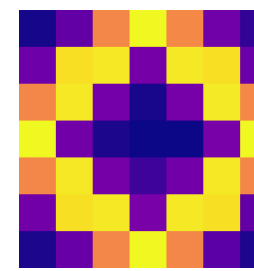
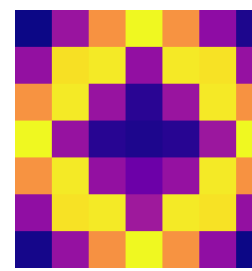
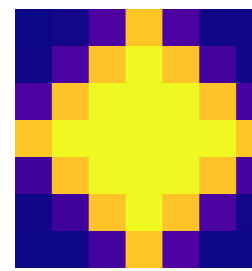
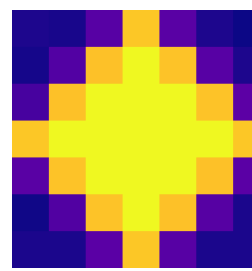
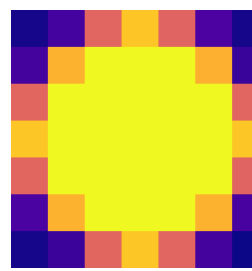
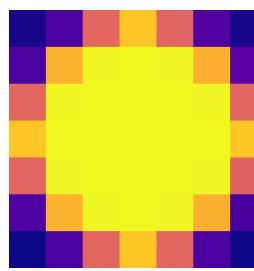
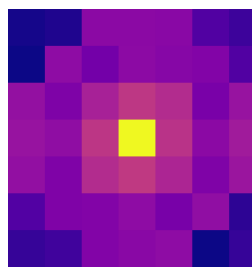
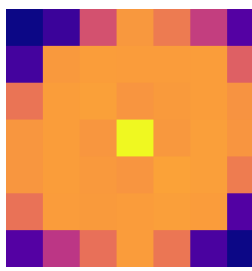
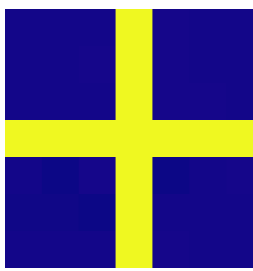
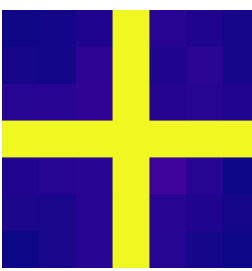
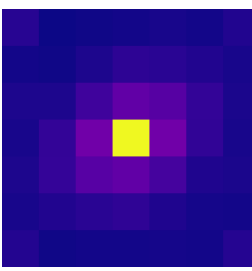
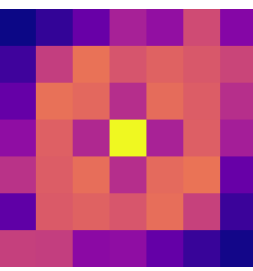
36 ± 5

32 ± 8

33 ± 2

SMorphTanh

w_1/w_2



α_1

-0.53 ± 0.001

-29.67 ± 0.02

-1.12 ± 0.001

-33.94 ± 0.46

-45.34 ± 0.04

-21.71 ± 0.04

-6.64 ± 2.32

-30.00 ± 0.06

α_2

-5.18 ± 0.008

47.32 ± 0.06

-0.63 ± 0.003

52.63 ± 0.07

54.49 ± 0.02

17.00 ± 0.01

-0.63 ± 0.06

49.47 ± 0.03

RMSE₁

$0.46 \pm 9 \times 10^{-4}$

$0.04 \pm 9 \times 10^{-3}$

$0.44 \pm 2 \times 10^{-3}$

$0.02 \pm 1 \times 10^{-2}$

$0.02 \pm 7 \times 10^{-3}$

$0.11 \pm 3 \times 10^{-3}$

$0.42 \pm 3 \times 10^{-2}$

$0.09 \pm 4 \times 10^{-3}$

RMSE₂

$0.23 \pm 1 \times 10^{-3}$

$0.01 \pm 5 \times 10^{-3}$

$0.36 \pm 1 \times 10^{-3}$

$0.02 \pm 8 \times 10^{-3}$

$0.01 \pm 1 \times 10^{-3}$

$0.05 \pm 6 \times 10^{-3}$

$0.41 \pm 3 \times 10^{-3}$

$0.02 \pm 8 \times 10^{-3}$

LOSS

$4.7 \times 10^{-3} \pm 9 \times 10^{-6}$

$1.6 \times 10^{-6} \pm 5 \times 10^{-7}$

$3.5 \times 10^{-3} \pm 7 \times 10^{-5}$

$1.9 \times 10^{-6} \pm 8 \times 10^{-7}$

$1.8 \times 10^{-6} \pm 4 \times 10^{-7}$

$6.9 \times 10^{-6} \pm 1 \times 10^{-6}$

$1.6 \times 10^{-3} \pm 9 \times 10^{-5}$

$2.1 \times 10^{-6} \pm 5 \times 10^{-7}$

EPOCHS

22 ± 7

32 ± 5

24 ± 7

39 ± 8

37 ± 6

37 ± 6

42 ± 14

34 ± 4