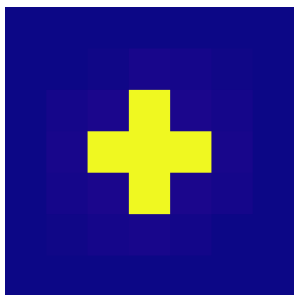
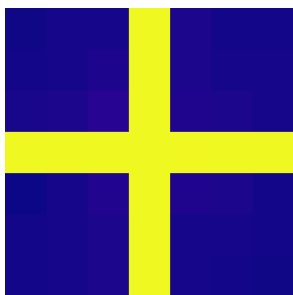


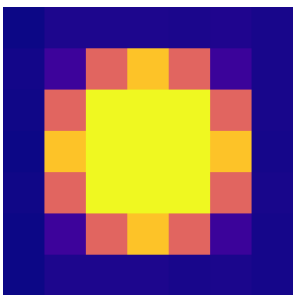
Opération : **ouverture**  
Jeu : **MNIST**



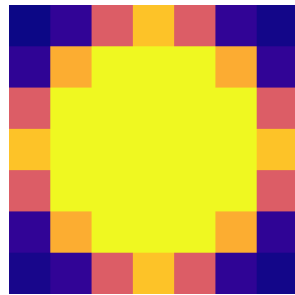
cross3



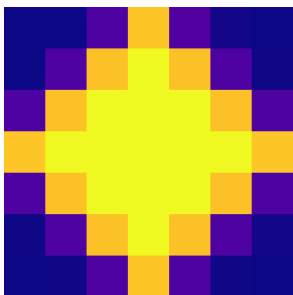
cross7



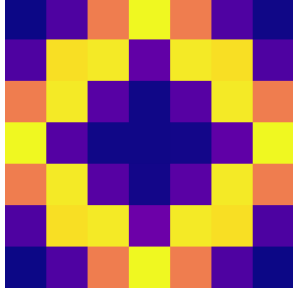
disk2



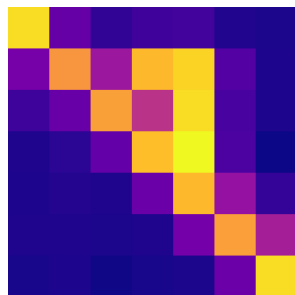
disk3



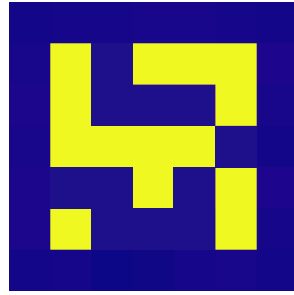
diamond3



complex



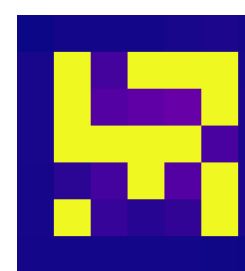
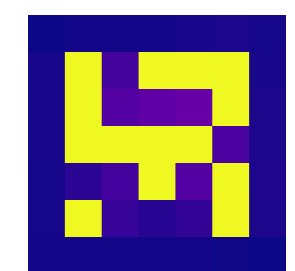
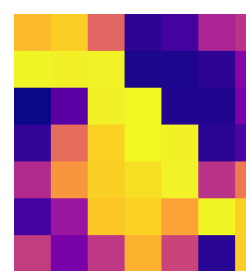
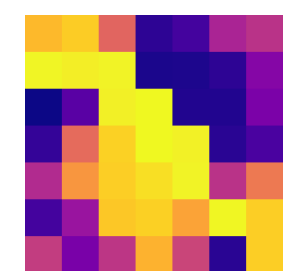
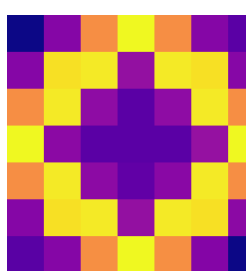
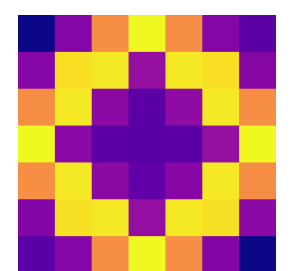
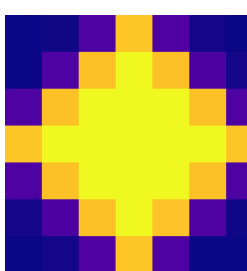
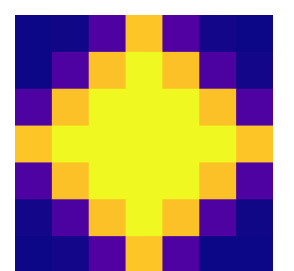
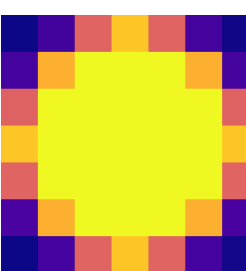
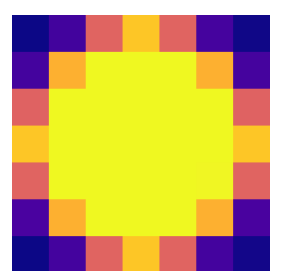
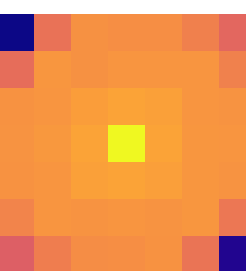
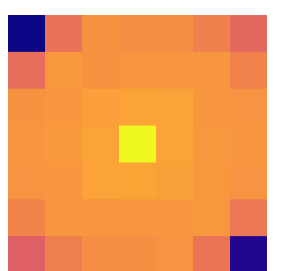
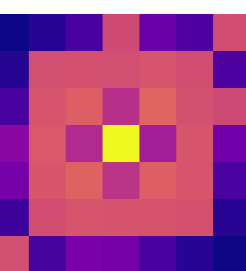
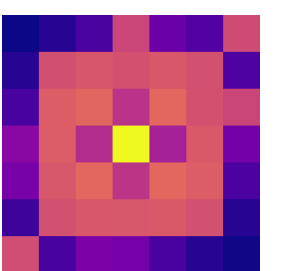
adiag



brand

*Sans*  $C_{awayOPP}$

$w_1/w_2$



$\alpha_1$

$-0.52 \pm 0.002$

$-29.98 \pm 0.04$

$-1.21 \pm 0.01$

$-34.89 \pm 0.02$

$-45.51 \pm 0.01$

$-23.24 \pm 0.03$

$-3.70 \pm 0.008$

$-29.35 \pm 0.10$

$\alpha_2$

$-5.25 \pm 0.011$

$47.58 \pm 0.01$

$-0.61 \pm 0.01$

$53.79 \pm 0.03$

$55.07 \pm 0.01$

$17.55 \pm 0.05$

$-0.36 \pm 0.003$

$49.59 \pm 0.05$

RMSE<sub>1</sub>

$0.43 \pm 3 \times 10^{-4}$

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

$0.53 \pm 1 \times 10^{-2}$

$0.004 \pm 6 \times 10^{-4}$

$0.005 \pm 2 \times 10^{-3}$

$0.11 \pm 7 \times 10^{-4}$

$0.51 \pm 5 \times 10^{-4}$

$0.05 \pm 2 \times 10^{-3}$

RMSE<sub>2</sub>

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

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

$0.53 \pm 1 \times 10^{-2}$

$0.004 \pm 6 \times 10^{-4}$

$0.005 \pm 2 \times 10^{-3}$

$0.11 \pm 7 \times 10^{-4}$

$0.51 \pm 4 \times 10^{-4}$

$0.05 \pm 2 \times 10^{-3}$

LOSS

$4.9 \times 10^{-3} \pm 3 \times 10^{-5}$

$1.5 \times 10^{-6} \pm 6 \times 10^{-7}$

$3.6 \times 10^{-3} \pm 3 \times 10^{-5}$

$1.4 \times 10^{-6} \pm 4 \times 10^{-7}$

$1.5 \times 10^{-6} \pm 4 \times 10^{-7}$

$5.1 \times 10^{-6} \pm 5 \times 10^{-7}$

$2.0 \times 10^{-3} \pm 2 \times 10^{-5}$

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

EPOCHS

$18 \pm 2$

$37 \pm 6$

$17 \pm 4$

$34 \pm 5$

$44 \pm 3$

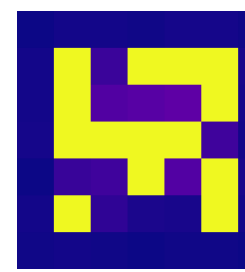
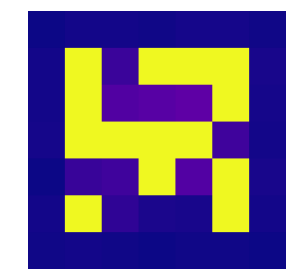
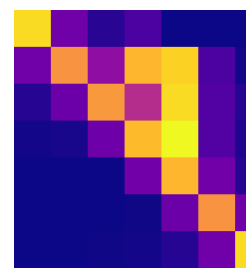
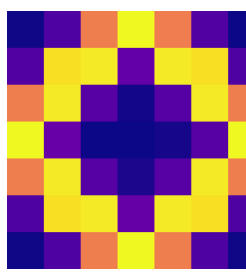
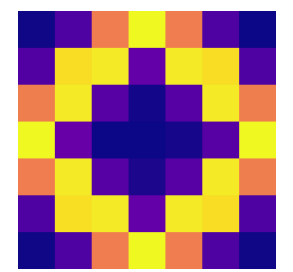
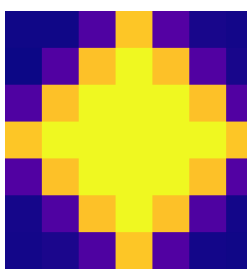
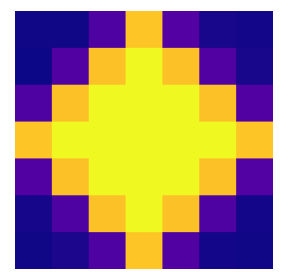
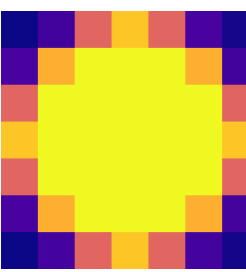
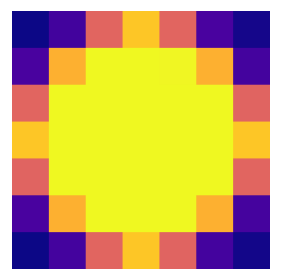
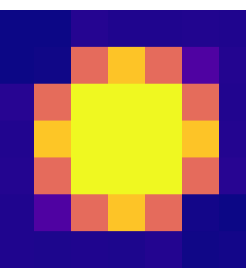
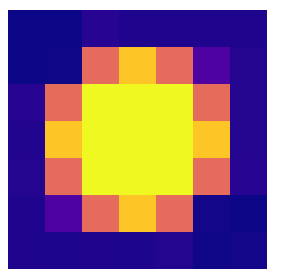
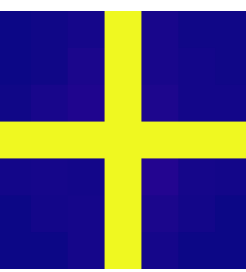
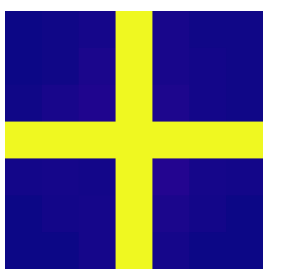
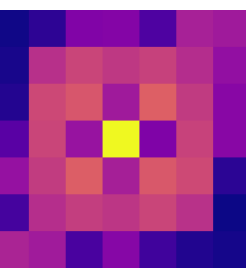
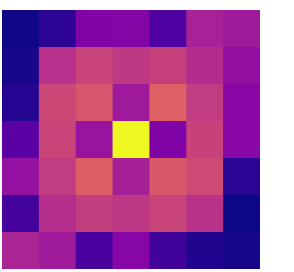
$39 \pm 6$

$37 \pm 6$

$36 \pm 9$

*Avec*  $C_{awayOPP}$

$w_1/w_2$



$\alpha_1$

$-0.40 \pm 0.001$

$-59.42 \pm 0.06$

$-58.12 \pm 0.10$

$-58.47 \pm 0.07$

$-60.90 \pm 0.05$

$-39.62 \pm 0.66$

$-61.29 \pm 0.07$

$-58.97 \pm 0.12$

$\alpha_2$

$-1.29 \pm 0.004$

$63.19 \pm 0.07$

$63.23 \pm 0.02$

$65.01 \pm 0.04$

$65.04 \pm 0.01$

$67.98 \pm 0.68$

$60.72 \pm 0.06$

$63.88 \pm 0.02$

RMSE<sub>1</sub>

$0.39 \pm 1 \times 10^{-3}$

$0.01 \pm 8 \times 10^{-4}$

$0.03 \pm 5 \times 10^{-4}$

$0.004 \pm 7 \times 10^{-4}$

$0.004 \pm 1 \times 10^{-3}$

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

$0.03 \pm 8 \times 10^{-3}$

$0.05 \pm 5 \times 10^{-3}$

RMSE<sub>2</sub>

$0.39 \pm 1 \times 10^{-3}$

$0.01 \pm 8 \times 10^{-4}$

$0.03 \pm 5 \times 10^{-4}$

$0.004 \pm 8 \times 10^{-4}$

$0.004 \pm 1 \times 10^{-3}$

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

$0.03 \pm 8 \times 10^{-3}$

$0.05 \pm 5 \times 10^{-3}$

LOSS

$1.6 \times 10^{-2} \pm 2 \times 10^{-5}$

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

$6.2 \times 10^{-6} \pm 7 \times 10^{-7}$

$1.2 \times 10^{-6} \pm 2 \times 10^{-7}$

$1.9 \times 10^{-6} \pm 2 \times 10^{-7}$

$2.3 \times 10^{-6} \pm 1 \times 10^{-6}$

$4.0 \times 10^{-6} \pm 7 \times 10^{-7}$

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

EPOCHS

$29 \pm 7$

$38 \pm 4$

$33 \pm 5$

$41 \pm 6$

$36 \pm 6$

$40 \pm 6$

$45 \pm 13$

$39 \pm 10$