Q if $A + B$ are diff. matrices satisfying $A^3 = B^3$ & $A^2B = B^2A$, find $\det(A^2+B^2)$

Ans

$A^3 - A^2B + AB^2 - B^3 = 0$

$A^2(A-B) + B^2(A-B) = 0$

$A^3 - A^2B + B^2A - B^3 = 0$

$A^2(A-B) + B^2(A-B) = 0$

$(A^2 + B^2)(A-B) = 0$

Null matrix → $\det(A^2+B^2) = 0$

if not → both are singular $\Rightarrow \det(A^2+B^2) = 0$