

Q Suppose $A + B$ are 2 sq. matrices of same order then

$$(A + AB^{-1}A)^{-1} + (A+B)^{-1} = \underline{\hspace{2cm}}$$

Ans.

$$= (A(1+B^{-1}A))^{-1} + (A+B)^{-1}$$

- i) ~~A^{-1}~~ ii) B^{-1}
iii) $2A^{-1}$ iv) $2B^{-1}$

$$= (A(B^{-1}B + B^{-1}A))^{-1} + (A+B)^{-1}$$

$$= (\cancel{B^{-1}})(B+A)^{-1}A^{-1}B + (A+B)^{-1}$$

$$= (\cancel{BA^{-1}+I})(A+B)^{-1}(BA^{-1}+I)$$

$$= (A+B)^{-1}(BA^{-1}+AA^{-1})$$

$$= A^{-1} \text{ Ans.}$$