If A and B are symmetric matrices of the same order and $X = AB + BA$ and $Y = AB - BA$, then XY^T is equal to

Solution : Given : A and B are symmetric.

Then, $A^T = A$ and $B^T = B$

$$XY^T = (AB + BA)(AB - BA)^T$$

$$= (AB + BA)\left((AB)^T - (BA)^T\right)$$

$$= (AB + BA)(B^T A^T - A^T B^T)$$

$$= (AB + BA)(BA - AB)$$

$$= -(AB + BA)(AB - BA)$$

$$= -XY$$

$$\therefore XY^T = -XY$$

A XY

B YX

C $-XY$

D None of these

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