Step-1

Let us show that for this splitting, $S^{-1}Tx = x$.

Since,
$$A = S - T$$
, we have $T = S - A$.

Consider the following:

$$S^{-1}Tx = S^{-1}(S - A)x$$

$$= S^{-1}Sx - S^{-1}Ax$$

$$= Ix - S^{-1}(0)$$

$$= x$$

Step-2

Thus, if $B = S^{-1}T$, then we get Bx = x, which implies that B has eigenvalue equal to 1.