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:

$$\begin{aligned} S^{-1}Tx &= S^{-1}(S - A)x \\ &= S^{-1}Sx - S^{-1}Ax \\ &= Ix - S^{-1}(0) \\ &= x \end{aligned}$$

Step-2

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