For $n \geq 1$ let $M$ be an $n \times n$ complex matrix with distinct eigenvalues $\lambda_1, \lambda_2, \ldots, \lambda_k$ with multiplicities $m_1, m_2, \ldots, m_k$, respectively. Consider the linear operator $L_M$ defined by $L_M(X) = MX + XM^T$, for any complex $n \times n$ matrix $X$. Find its eigenvalues and their multiplicities. ($M^T$ denotes the transpose of $M$; that is, if $M = (m_{k,l})$, then $M^T = (m_{l,k})$.)