

Solution (#772) If A is an $n \times n$ matrix which is singular then by Proposition 198(d) there exists a non-zero vector \mathbf{v} such that $A\mathbf{v} = \mathbf{0}$. Let

$$P = (\mathbf{v} \mid \mathbf{v} \mid \cdots \mid \mathbf{v}).$$

To find Q note that A^T is also singular.