Is the following proposition true?

proposition (Diagonally Dominant Matrix)
Let $A=[a_{ij}]\in \mathbb{R}^{n\times n}$ be a diagonally dominant matrix, $|a_{ii}|\geq \sum_{j\neq i}|a_{ij}|$, $\forall$ $i=1,2,\cdots,n$. If there exist k such that $|a_{kk}|> \sum_{j\neq k}|a_{kj}|$, then A_k is linearly independent of A_j, $\forall$ $j\neq k$, where $A_i=[a_{i1},a_{i2},\cdots,a_{in}]$ is the i-th row of A.

I cannot prove that the proposition is true nor can I find a counterexample.