Ax=b \text{ and } A(x+\Theta d) = b \Rightarrow \Theta Ad = 0 \Rightarrow Ad = 0

0 = Ad = \sum_{i=1}^{n} A_i d_i = \sum_{i=1}^{n} A_{(i)} B_{(i)} d_{B_{(i)}} + A_j = B d_B + A_j

Since B is invertible: \quad d_B = -B^{-1} A_j