Here is a flow chart showing the general algorithm. We use $e$ to stand for “equation number” and $v$ to stand for “variable number”.

Set $e = 1$.

Let $v$ be the smallest index such that $x_v$ has nonzero coefficient in an equation $(e')$ with $e' \geq e$.

Does the variable $x_v$ have nonzero coefficient in equation $(e)$?

yes

Yes

Does any variable $x_v$ have nonzero coefficient in any equation $(e')$ with $e' \geq e$?

no

no

Backsolve.

no

Increase $e$ by 1.

yes

Is $(e)$ the last equation?

no

Interchange equation $(e)$ with a later equation in which $x_v$ has nonzero coefficient.

yes

Use $(i) \rightarrow (i) + c_i(e)$ to eliminate $x_v$ from every equation $(i)$ with $i > e$. 
