$x = B^{-1} b^0$ $\qquad b^0 = (2A+I)(C^{-1}+A)\,b$

$= \underbrace{(2A+I)Ab}_{b'} + (2A+I)\,\underbrace{C^{-1}b}_{b^2}$

solve $Bx = b^0$ by LU / QR factorization

⋮

solve $Cb^2 = b$ ~~by factorization~~

$b^2 = C^{-1}b$

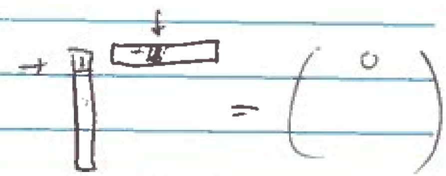
$Cb^2 = b$

① b^2 by solving $Cb^2 = b$

② $b' = (2A+I)Ab$

③ $b^0 = b' + (2A+I)b^2$

④ x by solving $B^{-1}b^0$



2.2(c)

$A \longrightarrow \tilde{A} = A + \underbrace{\begin{pmatrix} 0 & -2 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}}_{e_1^T e_2}$

$a_{12} = 4 \longrightarrow \tilde{a}_{12} = 2$

$e_k = \begin{pmatrix} 0 \\ 0 \\ \vdots \\ 1 \\ \vdots \\ 0 \\ 0 \end{pmatrix}$ ← kth slot $\qquad e_k(j) = \begin{cases} 1 & j = k \\ 0 & \text{o/w} \end{cases}$

$\tilde{A} = A - 2\,\underset{}{\overset{u}{e_1^T}}\,e_2$ $\qquad -2$

$\tilde{x} = \tilde{A}^{-1} b = \left(A^{-1} - \dfrac{A^{-1}uv^T A^{-1}}{1+v^T A^{-1} u}\right) b = \underbrace{A^{-1}b}_{x} - \dfrac{A^{-1}uv^T x}{1+v^T A^{-1} u} = \cdots$