1962 —

Note Title 2/8/2007

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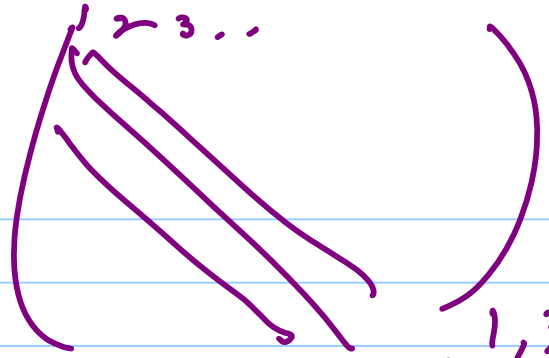
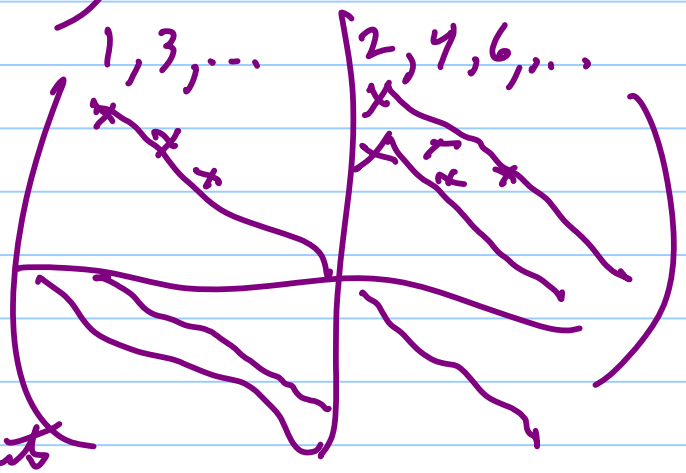
S. O. R =

Successive Overrelaxation

Property A: $A \cong A^T$

$\Pi A \Pi = \begin{pmatrix} D_1 & F \\ F^T & D_2 \end{pmatrix}$

$T =$ 

$\Pi T \Pi^T =$ 

$\underset{\sim}{x} = \begin{matrix} \underset{\sim}{u} \\ \underset{\sim}{v} \end{matrix}$ } odd components
even component

$$a \underset{\sim}{u} + F \underset{\sim}{v} = \underset{\sim}{b}$$
$$F^T \underset{\sim}{u} + a \underset{\sim}{v} = c$$

$$\underset{\sim}{u} = -\frac{1}{a} F \underset{\sim}{v} + \frac{1}{a} \underset{\sim}{b}$$

$$-\frac{1}{a} F^T F v + a \underset{\sim}{v} = \underset{\sim}{c}$$

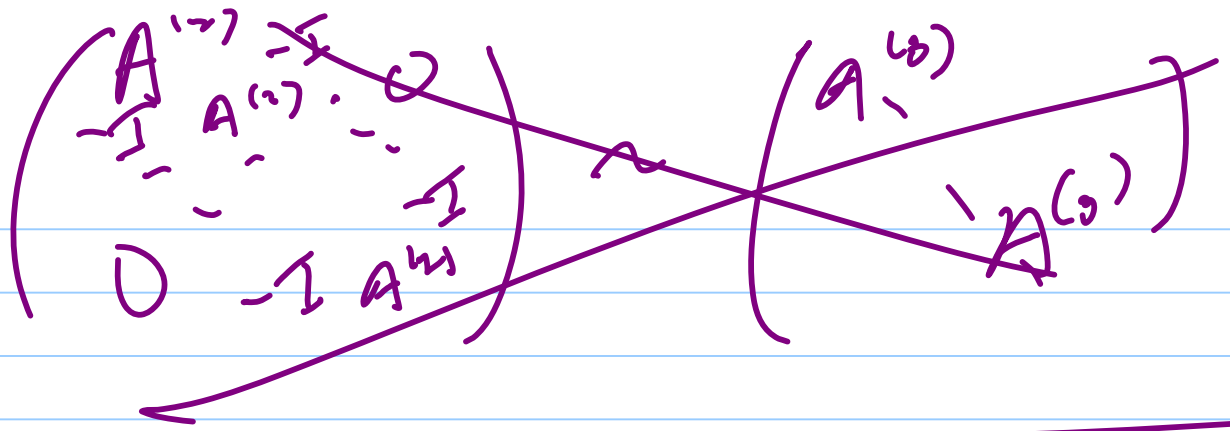
$$F^T F \underset{\sim}{v} - a^2 \underset{\sim}{v} = \underset{\sim}{d}$$

Cyclic reduction

$$\begin{pmatrix} \ddots & & \\ & \ddots & \\ & & \ddots \end{pmatrix}$$

$$\begin{pmatrix} A & -I & 0 \\ -I & \ddots & -I \\ 0 & -I & A \end{pmatrix}$$

$$A = \begin{pmatrix} \ddots & & \\ & \ddots & \\ & & \ddots \end{pmatrix}$$



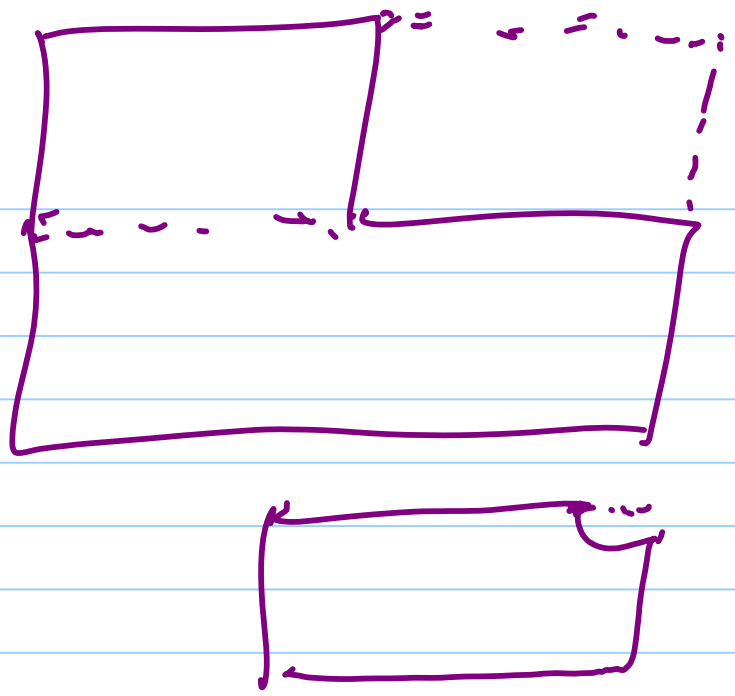
$$A\underset{\sim}{x} = \underset{\sim}{b}$$

$$A = LU$$

$$-\nabla a(x,y)\nabla u = f$$

$$-\Delta v^{k+1} + \sigma(x,y) v^{k} = g$$

$$Mv - Nv = g$$



Domain Decomposition

$$\tilde{A} = \left(\begin{array}{c|c} 0 & A \\ \hline A^T & 0 \end{array}\right) \qquad \lambda(\tilde{A}) = \pm\sigma(A)$$

$$\left(\begin{array}{c|c} 0 & B \\ \hline B^T & 0 \end{array}\right) \sim$$