

GE preserves symmetry

$$a(i,j) = a(i,j) - \frac{a(i,k)}{a(k,k)} \text{piv} \cdot a(k,j)$$

$$a(j,i) = a(j,i) - \frac{a(j,k)}{a(k,k)} \cdot a(k,i)$$

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Row Cholesky

$$\text{piv} = a(i,k) / a(k,k)$$

GE:

$$a(i,j) = a(i,j) - a(i,k) \cdot a(k,j) / a(k,k)$$

scale kth row

$$\tilde{a}(k,:) = a(k,:) / \sqrt{a(k,k)}$$

back to GE $a(i,k)$ becomes $a(k,i)$ (symmetry):

$$a(i,j) = a(i,j) - a(k,i) \cdot a(k,j) / a(k,k) \rightarrow$$

express $a(k,i)$, $a(k,j)$ in terms of $\tilde{a}(i,k)$ $\tilde{a}(j,k)$

$$a(i,j) = a(i,j) - \sqrt{a(k,k)} \tilde{a}(k,i) \cdot \sqrt{a(k,k)} \tilde{a}(k,j) / a(k,k)$$

$$a(i,j) = a(i,j) - \tilde{a}(k,i) \cdot \tilde{a}(k,j)$$