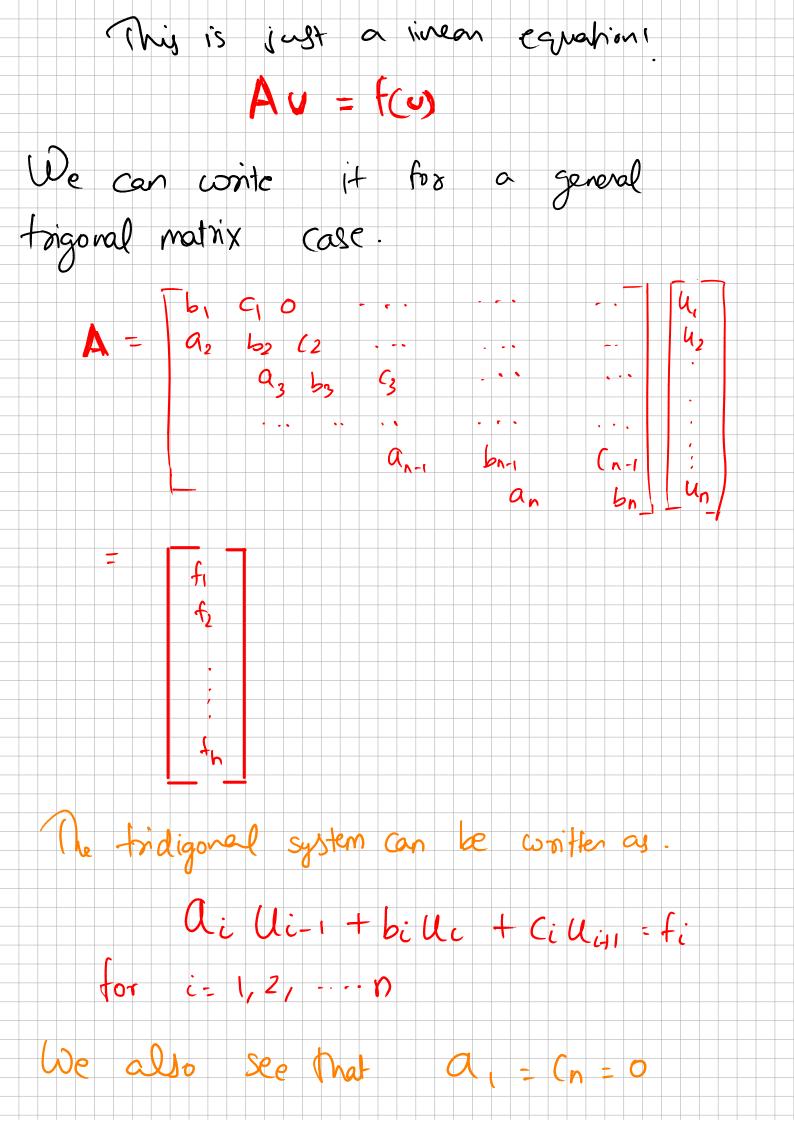
GAUSSIAN ELIMINATION Ax = W Starting of with this set of linear equations. * We also augure A is non-singular. After n-1 eliminations, we get a so-called when triangular matrix · B X = Y We see that $\chi_{m} = \frac{1}{b_{mn}} \left(y_{m} - \sum_{k=m+1}^{n} b_{mk} \chi_{k} \right)$ M = N-1, N-2, ... The forward substitution nothed in garysian Climination method converts The matrix Coefficients A and W $a_{jk} = a_{jk} - a_{jm} a_{mic}$ 1/16 - M-1/...

Toidiagonal Matrices Suppose use want to solve the following boundary value equation: $-\frac{d^2u(x)}{dx^2} = f(x, u(x))$ cin x ∈ (a, b) and U(a) = U(b) = 0 being the Boundary To solve this D. F. we approximate the second don't where. f" = fh -2fo +f-h $+ O(h^2)$ h² XECab) Subdivide into a subintered i = 0, 1, · η+1 $h = (b-a) \quad (n \in \mathbb{N})$ Step size

. The equation becomes, U"(xi) 2 U(xi+h) -2U(xi)+U(xi-h) Ui & Ui+1 - 2ui + Ui-1 $\frac{di_{11}-2ui+di_{1}}{h^{2}}=f\left(x_{1},u(x_{1})\right)$ C=1/2/...n If we define a matrix This is a trigoral matrix A and the Corresponding $V = (U_1, U_2, \dots, U_n)^T$ $f(0) = f(x_1, x_2, \dots, x_n, 0, x_2, \dots, x_n)$



& U, & Un, are not seemed. In many cases the matrix is symmetric and we have a: - (: The algorithm is just a normal Crausian climination one. But due to its simplicity, N(Hoat point) - (n) while womally it is 2n3 t (n2) Forward Substitution bi = bi - ai (ifi Recall bi = bi & fi = fi always

Backward Substitution - Ci-1 Uc Di-1 Un = when i=n with In the case of a D.E like this $\frac{d^2u(x)}{dx^2} = f(x, v(x))$ We can see that, bi

