Numerical Methods

Week 3 code

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```
function x=tridiag(dm,d0,dp,b)
% Gauss method for tridiagonal matrix

  N=length(d0);
  if N ~= length(dm)+1 | N ~= length(dp)+1 | N ~= length(b)
    error('Dimentions mismatch');
  end

  %Gauss elimination
  for k=1:N-1
    c=dm(k)/d0(k);
    d0(k+1)=d0(k+1)-c*dp(k);
    b(k+1)=b(k+1)-c*b(k);
  end

  %Backward substitution
  x(N,1)=b(N)/d0(N);
  for k=N-1:-1:1
    x(k)=(b(k)-dp(k)*x(k+1))/d0(k);
  end
```

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```
function x=gauss_seidel(A,b,x0,tol)
% Gauss-Seidel method for Ax=b
% tol is the tollerance,
%  computations stop when ||Ax-b||<tol

  N=size(A,1);
  if size(A,2) ~= N | size(b,1) ~= N | size(x0,1) ~= N | size(x0,2) ~= 1
    error('Dimentions mismatch')
  end

  x=x0;
  while max(abs(A*x-b))>tol
    for k=1:N
      x(k)=(-A(k,1:k-1)*x(1:k-1)-A(k,k+1:end)*x(k+1:end)+b(k))/A(k,k);
    end
    if max(abs(x))>1e6, error('Algorithm diverges'), end
  end
```

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