**Algorithm 1: Jacobi Method**

|  |
| --- |
| Method introduction: |
| 简单叙述这个方法的计算思想，计算公式，适用对象，优缺点等内容。这部分属于偏数学的东西。  （英文书写不要超过1页）  Compute thought:  A=U+L+D  Ax=b namely(U+L+D)x=b  Dx=-(U+L)x+b,we have  x(k+1)=-inv(D)(U+L)x(k)+inv(D)\*b  compute formular:  x(k+1)=-inv(D)(U+L)x(k)+inv(D)\*b  suitable object:norm(A)<1 |
| Algorithm Design |
| step 1 : resolve A,we can get U,L,D  step 2 : compute the value of inv(D)  step 3: programing according to compute formular |
| Matlab code |
| function [x1, eor, iterations] = Jacobi( A, b, x0, tol, Max\_iterations)  %JACOBI Jacobi迭代求解线性方程组  % [m, n] = size(A);  if nargin < 5  Max\_iterations = 500;  elseif nargin <4  tol = 1e-6;  elseif nargin <3  x0 = zeros(size(A,1),1);  elseif nargin<2 || nargin>6  error('Input error!');  end  L = tril(A, -1);  D = diag(diag(A));  U = triu(A, 1);  E = -inv(D)\*(L+U);  f = inv(D)\*b;  for i = 1: Max\_iterations  x1 = E\*x0+f;  eor = norm(x1-x0,1);  if(eor < tol)  fprintf('The iteration convergened.\n');  break;  end  x0 = x1;  end  if(i == Max\_iterations)  fprintf('Reached max iterations.\n');  end  iterations = i;  end |
| Examples and Result |
| Example3,1,1(P197)  A=[4 2 1;1 3 1;1 1 4;];b=[3;-1;4];x0=[0;0;0];tol=10^(-6);Max\_iterations=50;  [x1, eor, iterations]=Jacobi( A, b, x0, tol, Max\_iterations)  Results:  The iteration convergened.  x1 =  1.0000  -1.0000  1.0000  eor =  8.2200e-07  iterations =  33  Remarks |
| 此处写该方法程序设计的一些注意事项，也可以空白 |
|  |