

```
%
% x=irls(A,b,tolr,tolx,p,maxiter)
%
% This function uses the iteratively reweight least squares strategy
% to find an approximate L_p solution to Ax=b.
%
% Inputs;
%   A           Matrix of the system of equations.
%   b           right hand side of the system of equations.
%   tol         Tolerance below which residuals are ignored.
%   p           Specifies which p-norm to use.
%   maxiter     Limit on number of iterations of IRLS
%
% Outputs:
%   x           Approximate L_p solution.
function x=irls(A,b,tolr,tolx,p,maxiter)
%
% Find the size of the matrix A.
%
[m,n]=size(A);
%
% Start the first iteration with R=I, and x=A\b (the lsq solution)
%
R=eye(m);
x=A\b;
%
% Now loop up to maxiter iterations
%
iter=1;
while (iter <= maxiter)
    iter=iter+1;
    r=A*x-b;
    for i=1:m
        if (abs(r(i)) < tolr)
            r(i)=abs(tolr)^(p-2);
        else
            r(i)=abs(r(i))^(p-2);
        end
    end
    R=diag(r);
    newx=(A'*R*A)\(A'*R*b);
    if (norm(newx-x)/(1+norm(x)) < tolx)
        return;
    else
        x=newx;
    end
end
end
```