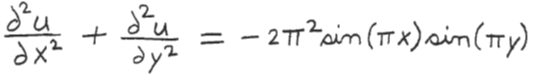
**Sample 10 Steps**

**Poisson Equation**

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**Before writing the function poisson, obtain the equation to be iterated by**

**doing the following:**

**1) Approximate the second order partial derivatives in the Poisson Equation**

**by the 3-point second order central difference formula, using the point**

**with indices i,j as the central point:**

****

**where ui,j = u(xi,yj) , fi,j = f(xi,yj) where f(x,y) is the function on the**

**right of the equals sign in the Poisson Equation, and h is the stepsize**

**in both the x and y intervals.**

**2) Solve the equation for uij :**

****

**% function poisson**

**function u = poisson(f, g, L, n, accuracy)**

**h = L/(n-1);**

**u = zeros(n,n);**

**for(i = 1:n)**

**u(i,1) = g( (i-1)\*h, 0 );**

**u(i,n) = g( (i-1)\*h, L );**

**end**

**for(j = 1:n)**

**u(1,j) = g( 0, (j-1)\*h );**

**u(n,j) = g( L, (j-1)\*h );**

**end**

**max\_diff = 1;**

**while(max\_diff >= accuracy)**

**max\_diff = 0;**

**for(i = 2:n-1)**

**for(j = 2:n-1)**

**uij\_old = u(i,j);**

**u(i,j) = 1/4\*( u(i-1,j) + u(i+1,j) + u(i,j-1) + u(i,j+1) ...**

**- h^2 \* f( (i-1)\*h, (j-1)\*h) );**

**diff = abs(u(i,j) - uij\_old);**

**if(diff > max\_diff)**

**max\_diff = diff;**

**end**

**end**

**end**

**end**