BSupoutCallI\_ARBF.m is the main function for the Barrier up and out call option.

The Input parameters are:

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S=100; %Stock price at time 0

K=100; %Strike Price

r=0.03; %Interest rate

sig=0.15; %Volatility

T=1; %Maturity

M=60; %Time Step

N=100; %Space step

theta=0.5;% Crank-Nicolson-This is theta method

a=1; % min S value

b=2\*K; %Max S value

cg=1.03; % the percentage of a function of adaptive shape parameter that every center has its own shape parameter is based on spacinf to its nearest center.

This value affects the accuracy and conditioning of the interpolation matrix. The range should be something from 0.5 to 1.1.

err=1e-2; % error setting

err = [err/2 err/20];% refine when the residual greater than err1 and coarse when the residual is less than err2.

e=0.93\*log(K);

f=1.05\*log(K);

e and f are the range of the area which we want to use adaptive

B=b; %Barrier value

maxdis=4\*(ksi(2)-ksi(1));% Max distance between each point

mq.m is the function which generate multiquadric function and its derivatives.

mid\_points\_amend.m generates the middle points for each refining point.

pred1.m is the spline approximation function.

residuals.m is the function for local approximation.

Predictor.m is the function for predicting the new solution set

Coarserfine1.m and coarserfine3.m are coarsening and refining function .