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function supp_fig_1
clc;clear;close all;

%%%%%
% Initialize the complex plane points to sample
%width of the square in the complex plane, centered on zero
D = 70;
%number of points per side of grid
nnn = 1000;
R = linspace(-D/2,D/2,nnn);
[R_,I_] = ndgrid(R,R);
z = R_( :) + I_( :)*1i;

purp = [239,171,245]/255;

%calculate the MATLAB built-in benchmark results
tic;
tru = expint(z);
t_matlab = toc;

%define functions to evaluate
func = { ...
    @(z)el_pade_n_b(z,6),...
    @(z)el_pade_n_c(z,10),...
    @(z)el_pade_n(z,10),...
    @(z)-ei_cheb_lt8(-z,20)-sign(angle(z))*1i*pi,...
    @(z)-ei_cheb_gt8(-z,20)-sign(angle(z))*1i*pi,...
    @(z)el_series_2(z,55),...
    @(z)melz_gg200131_comb_4(z)};
n=8;

p1=[227,172,82]/255;
p2=[252,222,164]/255;
p3=[90,180,172]/255;
map = NaN(n*2,3);
for i = 1:3
    map(1:n,i) = linspace(p1(i),p2(i),n);
    map((n+1):end,i) = linspace(p2(i),p3(i),n);
end

name = {'pade1','pade2','pade3','cheb1','cheb2','taylor','Combined'};

%define axes and elliptical regions to draw
axBIG = subplot(2,5,[4,5,9,10]);hold on;
cent = [-6.5,-10,-.65,-4.5];
rad_1 = [17,15,4.05,4.5];
rad_2 = [13,9.5,4,2.3];

%begin to evaluate approximations
for i = 7:-1:1

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tic
est=func{i}(z);
t_ = toc;

if i>3,JJ=i+2;else JJ=i;end
if i<7
    ax = subplot(2,5,JJ);
    axes(ax)
else
    axes(axBIG);
end

%calculate error value, clamping at 1e-18
val = log10(abs(est-tru)./abs(tru));
val(val<-18)=-18;
colormap(map);

%draw behavior of approximation error throughout the complex plane
[~,HH]=contourf(R_,I_,reshape(val,size(R_)),30); hold on;
set(HH,'LineColor','none')

%center colormap at 1e-8
caxis([-18,2]);
axis(D/2*[-1 1 -1 1]);
title(name{i},'FontWeight','Normal');

%print error and timing diagnostics
fprintf('%i: %s maxerr: %.3f, Tref/T = %.3f.\n',i,name{i},...
        max(log10(abs(est-tru)./abs(tru))),t_matlab/t_);

set(gca,'xcolor','none','ycolor','none','FontSize',12,'color','none')

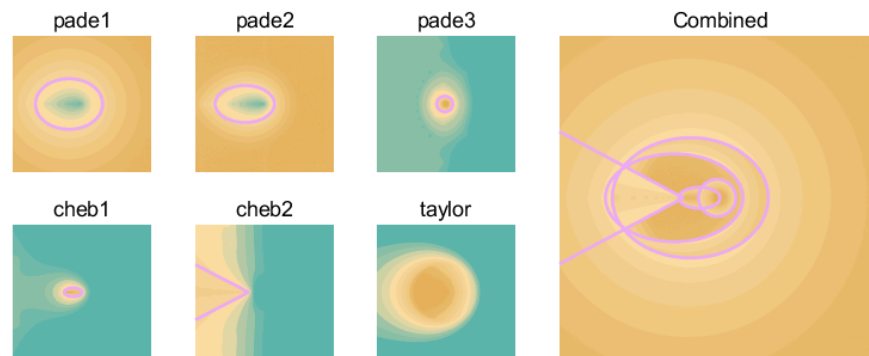
%plot the approximation bounds
if i < 5
    th_ = linspace(0,2*pi,100);
    x_ = rad_1(i)*cos(th_)+cent(i);
    y_ = rad_2(i)*sin(th_);
    axes(ax)
    plot(x_,y_,'-','Color',purp,'LineWidth',2);
    axes(axBIG)
    plot(x_,y_,'-','Color',purp,'LineWidth',2);hold on;
elseif i==5
    xl=xlim;
    x_ = linspace(xl(1),-8,50); x_ = [x_ fliplr(x_)];
    y_ = linspace(0.5294*(-8-xl(1)),0,50); y_ = [y_ -fliplr(y_)];
    axes(ax)
    plot(x_,y_,'-','Color',purp,'LineWidth',2);
    axes(axBIG)
    plot(x_,y_,'-','Color',purp,'LineWidth',2);hold on;
end
end

set(gcf,'Units','Normalized','Position',[0.2188 0.3630 0.4885 0.3083])

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return
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7: Combined maxerr: -7.953, Tref/T = 19.472.  
6: taylor maxerr: 34.897, Tref/T = 6.881.  
5: cheb2 maxerr: 46.743, Tref/T = 13.580.  
4: cheb1 maxerr: 33.213, Tref/T = 11.148.  
3: pade3 maxerr: 15.168, Tref/T = 33.190.  
2: pade2 maxerr: 0.798, Tref/T = 34.828.  
1: pade1 maxerr: 0.915, Tref/T = 47.254.
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