

Homework 5 Part I Solution

```
function spline_parm.m
function [a,b,c,d]= spline_parm(x,y)
N=length(x)-1;
h=diff(x);
D=diff(y)./h;
dD3=3*diff(D);
a=y(1:N);
H=diag(2*(h(2:N)+h(1:N-1)));
for k=1:N-2
    H(k,k+1)=h(k+1);
    H(k+1,k)=h(k+1);
end
c=zeros(1:N+1);
c(2:N)=H\dD3';
b=D-h.*(c(2:N+1)+2*c(1:N))/3;
d=(c(2:N+1)-c(1:N))./(3*h);
```

```
function spline_eval.m
function yy = spline_eval(a,b,c,d,xx)
p=length(xx);
N=length(a);
for i=1:p
    k=1;
    while(xx(i)>k+1)&(k<N)
        k=k+1;
    end;
    diff=xx(i)-k;
    yy(i)=a(k)+diff*(b(k)+diff*(c(k)+diff*(d(k))));
end
```

hw5a.m

```
x=1:9;
y=[9 2 6 4 8 8 7 0 3];
[a,b,c,d]=spline_parm(x,y);
xx=1:0.1:9;
yy=spline_eval(a,b,c,d,xx);
pp=csape(x,y,'variational');
yyc=ppval(pp,xx);
err=yy-yyc;

subplot(2,1,1);
```

```
plot(xx,err);  
title('Plot of Error in My Personal Spline');  
  
subplot(2,1,2);  
plot(xx,yy);  
title('Personal spline of Alan Turning');
```

The resulting plots:

