

MATH 142 – HOMEWORK PROJECT 1 - DUE THUR, 1/22

Assignment: Turn in hardcopy of the three files given here and the output file for the integral $\int_0^1 e^x(1 + e^{-2x}) dx$ with k going from 1 to at least 12.

```
% File: fint1d.m
% 1-d function integrator (left hand rule)
% must have function files f1 and cf1 (integrand and antiderivative)

fdat = fopen('test.dat','w');
fprintf(fdat,' k          sk          -log(h)  -log(err) \n');

a = input('a = ');
b = input('b = ');

exactval = cf1(b) - cf1(a);
fprintf('F(b) - F(a): %16.6e \n',exactval)

k = 1;
clear logh loge
n = 0;
while (n==0)

    m = 2^k;
    h = (b-a)/m;
    xi = a;
    sk = 0;

    for i = 1:m
        sk = sk + f1(xi);
        xi = xi + h;
    end

    sk = sk*h;

    fprintf('k, h, s: %5d   %16.6e   %16.6e \n',k,h,sk)

    r0 = -log10(h);
    d2 = abs((sk-exactval)/exactval);
    d3 = -log10(d2);

    logh(k) = r0;
    loge(k) = d3;

    fprintf('-log(h), -log(err): %16.6e   %16.6e \n',r0,d3)
```

```
fprintf(fdat,'%5d  %16.6e  %6.3f  %6.3f \n',k,sk,r0,d3);  
  
n = input('Enter 0 to continue; other to stop: ');  
  
k = k + 1;  
end  
  
fclose(fdat)
```

```
function y = f1(u)  
% File: f1.m  
% integrand  
  
y = exp(u)*(1+exp(-2*u));  
  
return
```

```
function y = cf1(u)  
% File: cf1.m  
% antiderivative of f1  
  
y = exp(u) - exp(-u);  
  
return
```