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Part 1

Use Composite Trapezoidal and Composite Simpson's Rules to solve Fredholm Integral Equation of the second kind

```
fprintf("Part 1\n");
```

```
Part 1
```

Section A

```
fprintf("Section A\n");

a = 0;
b = 1;
f = @(x) x.^2;
K = @(x, t) exp(abs(x-t));
m = 4;

h = (b-a)/m;
x = a + h*(0:m);
x = x';

A = [ h/2*K(x(1:end),x(1)), h*K(x(1:end),x(2:end-1)'),
 h/2*K(x(1:end),x(end)) ];

A = A - eye(size(A,1));

u = A\-f(x);

for i = 1:size(u,1)
    fprintf('u(x%.f) = %f\n',i ,u(i));
end
```

```
Section A
u(x1) = -1.154255
u(x2) = -0.909330
u(x3) = -0.715314
u(x4) = -0.547295
u(x5) = -0.393126
```

Section B

```
fprintf("Section B\n");
```

```
a = 0;
b = 1;
f = @(x) x.^2;
K = @(x, t) exp(abs(x-t));
m = 4;

h = (b-a)/m;
x = a + h*(0:m);
x = x';

A = [ h/3*K(x(1:end),x(1)), h/3*K(x(1:end),x(2:end-1)'),
 h/3*K(x(1:end),x(end)) ];

for i = 2:size(A,1)-1
    if mod(i, 2) == 0
        A(:,i) = 2*A(:,i);
    else
        A(:,i) = 4*A(:,i);
    end
end
A = A - eye(size(A,1));

u = A\-f(x);

for i = 1:size(u,1)
    fprintf('u(x%.f) = %f\n',i ,u(i));
end
```

```
Section B
u(x1) = -2.593956
u(x2) = -2.066886
u(x3) = -1.722637
u(x4) = -1.667428
u(x5) = -1.767721
```

Section C

```
fprintf("Section C\n");

a = 0;
b = 1;
f = @(x) x.^2;
K = @(x, t) exp(abs(x-t));
m = 10;

h = (b-a)/m;
x = a + h*(0:m);
x = x';

A = [ h/2*K(x(1:end),x(1)), h*K(x(1:end),x(2:end-1)'),
 h/2*K(x(1:end),x(end)) ];
```

```
A = A - eye(size(A,1));

u = A\-f(x);

for i = 1:size(u,1)
    fprintf('u(x%.f) = %f\n',i ,u(i));
end
```

```
Section C
u(x1) = -1.188894
u(x2) = -1.077665
u(x3) = -0.978910
u(x4) = -0.889964
u(x5) = -0.808655
u(x6) = -0.733240
u(x7) = -0.662356
u(x8) = -0.594972
u(x9) = -0.530367
u(x10) = -0.468100
u(x11) = -0.408002
```

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