

LagrangeInterpExample.m

```
% Example: LagrangeInterp
% Find the second-degree Lagrange interpolation polynomial for the
% specified x and y arrays. Then, use this polynomial to find the
% interpolated value at x=0.3.
```

```
% specify x array
x = [0.1 0.5 0.9];
```

```
% specify y array
y = [0.12 0.47 0.65];
```

```
% call the LagrangeInterp function with x=0.3
yi = LagrangeInterp(x, y, 0.3);
```

```
% display the interpolated value
disp(yi);
```

LagrangeInterp.m

```
function yi = LagrangeInterp(x, y, xi)
%
% LagrangeInterp finds the Lagrange interpolating polynomial that fits the data (x,y) and uses it
% to find the interpolated value at xi.
%
% yi = LagrangeInterp(x, y, xi) where
% x, y are n-dimensional row or column vectors of data,
% xi is a specified point,
% yi is the interpolated value at xi.

% find the number of elements in x
n = length(x);

% pre-allocate L with all zeros
L = zeros(1, n);

% loop to calculate the Lagrange coefficients of the polynomial
for i=1:n,
    L(i) = 1;
    for j=1:n,
        if j ~= i,
            L(i) = L(i) * (xi - x(j)) / (x(i) - x(j));
        end
    end
end

% add the polynomial terms together
yi = sum(y .* L);
end
```

To run LagrangeInterpExample.m,
type “LagrangeInterpExample” on matlab prompt, and hit return.

```
Command Window
>> LagrangeInterpExample
    0.3162
fx >>
```