

```

function y = Fseriesval(a,b,x,scale)

% FSERIESVAL Evaluates real Fourier series approximation at given data values
%
% Y = FSERIESVAL(A,B,X) the Fourier expansion of the form
%  $y = A_0/2 + \sum_k [ A_k \cos(kx) + B_k \sin(kx) ]$ 
% at the data values in the vector X.
%
% Y = FSERIESVAL(A,B,X,RESCALING) scales the X data to lie in the interval
% [-pi,pi] if RESCALING is TRUE (default). If RESCALING is FALSE, no
% rescaling of X is performed.
%
% See also: Fseries

if nargin<3
    error('MATLAB:Fseriesval:MissingInputs','Required inputs are a, b, and x')
end
checkinputs();

% scale x to [-pi,pi]
if scale
    x1 = min(x);
    x2 = max(x);
    x = pi*(2*(x-x1)/(x2-x1) - 1);
end

% make design matrix
nx = x*(1:n);
F = [0.5*ones(size(x)),cos(nx),sin(nx)];

```

```
% evaluate fit
```

```
y = F*[a;b];
```

```
% transpose y back to a row, if x was a row
```

```
if xrow
```

```
    y = y';
```

```
end
```

```
function checkinputs
```

```
    % coefficients
```

```
    if isnumeric(a) && isvector(a) && isnumeric(b) && isvector(b)
```

```
        % get number of terms in F series
```

```
        n = length(b);
```

```
        if length(a) ~= (n+1)
```

```
            throwAsCaller(MException('MATLAB:Fseriesval:InconsistentCoeffs','Inconsistent coefficient vectors'))
```

```
        end
```

```
    else
```

```
        throwAsCaller(MException('MATLAB:Fseriesval:WrongDataType','Coefficients must be numeric vectors'))
```

```
    end
```

```
    % x values
```

```
    if isnumeric(x) && isvector(x)
```

```
        % transpose x to a column if it is a row
```

```
        if size(x,2)>1
```

```
            x = x';
```

```
        xrow = true;
    else
        xrow = false;
    end
else
    throwAsCaller(MException('MATLAB:Fseriesval:WrongDataType','x values must be a numeric
vector'))
end
% optional scaling argument
if exist('scale','var')
    if ~islogical(scale)
        throwAsCaller(MException('MATLAB:Fseriesval:WrongDataType','Scaling parameter must
be logical (true/false)'))
    end
else
    scale = true;
end
end
end
```