

```

function fval = Eval_ShapeFn(fIdx,order,choice)
% $Author : Vignesh Ramakrishnan$
% $RIN : 662028006$   $Date : November 10, 2021$
% $Code Version: 1.0$
% This function evaluates the Shape functions at the integration points
% chosen for the element. It performs this operation for bilinear
% operations, Diffusion and Convection. For Diffusion, the derivative of
% the shape functions are evaluated and for convection, a derivative and a
% shape function is evaluated.
% Inputs : fIdx    : Takes the indices of the the shape functions to be
%                  evaluated at the integration points
%          order   : order of interpolating polynomials to use
%          choice  : The choice of integration operation to perform -
%                  Diffusion or convection
% Output : fval    : Array of function evaluations at integration points for
%                  the required indices

[ShapeFn,DShapeFn] = H1_FECollection(order);
[Quad_pts,~] = IntRules();
fval = zeros(length(fIdx),length(Quad_pts));

if choice == 2 % convection
    for i=1:2
        for j=1:length(Quad_pts)
            if i == 1
                fval(i,j) = DShapeFn{fIdx(i)}(Quad_pts(j));
            else
                fval(i,j) = ShapeFn{fIdx(i)}(Quad_pts(j));
            end
        end
    end
end

if choice == 3 % diffusion
    for i=1:2
        for j=1:length(Quad_pts)
            fval(i,j) = DShapeFn{fIdx(i)}(Quad_pts(j));
        end
    end
end

end

```

