```
function c_sub = ConvectionIntegrator(conv_coeff,B_zn,S_zn,LocalGridArr,par)
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% $Code Version: 1.0$
% This function performs the convection weak integration.
% Inputs : conv_coeff   - coefficient matrix or scalar integration
%                         constants
%          B_zn         - Shape Function gradients evaluated at integration
%                         points
%          S_zn         - Shape Function evaluated at integration points
%          LocGridArr   - The Grid Locations of the nodes present in the
%                         element being integrated
%          par          - Parameter that influences the flux
% Outputs: c_sub        - Element Stiffness matrix for convection
%                         integration

    choice = 2; % convection
    flux = Calc_Flux(S_zn,LocalGridArr,par);
    [B,detJ] = ElementTransformation(B_zn,LocalGridArr,choice);
    num_Int = length(detJ);
    [~,n,~] = size(B);
    c_sub = zeros(n);

    for i=1:num_Int
        t = flux(:,:,i).*S_zn(:,:,i);
        c_sub = c_sub + B(:,:,i)'*t*detJ(i);
    end

    c_sub = conv_coeff*c_sub;

end
```

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