```
function [ Y, V ] = YV_Form_nonzero( input_data, output_data, p)
% YV_Form
% Calculates the Y and V Matrix for ARX models


[k1, r] = size(input_data);
[k2, m] = size(output_data);

Y = zeros(m,k1);
V = 0;
V_lower = zeros(r+m,p,k1);



if k1~=k2
    error('Input and Output Size Mismatch')
end
k = k1;
V_query =[input_data(:,:),output_data(:,:)].';
for i=0:k-1
    if i<p
        idx = i;
        if idx<1
            continue
        end
        vv = flip(V_query(:,1:i),2);
        V_lower(:,1:i,i+1) = reshape(vv(:),r+m,[]);

    else
        vv = flip(V_query(:,i-p+1:i),2);
        V_lower(:,:,i+1) = reshape(vv(:),r+m,[]);

    end



end
V_ll = reshape(V_lower,p*(r+m),[]);
V = [input_data(:,:)';V_ll];
Y = output_data(:,:)';


end
```

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