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# SLR based on Sigma Points

Inputs:  $u_1$ ,  $W_1$  - mean and Covariance matrix for two nodes which is to be linearised  
Outputs:  $A$ ,  $b$ ,  $\sigma$   
- Linearisation Parameters.  $A = [A_1 \ A_2]$

```
function [A, b, sigma] = doSLR(u1, W1)
    N = 4;
    X = zeros(4,9);

    % Sigma Points and Corresponding Weight Generation
    -----
    X(:,1) = u1;
    w1 = 1/3;
    w0 = (1-w1)./(2.*N);
    T = chol(W1);
    f = (N/(1-w1))^(1/2);

    % Approximating Linearisation based on the sigma points selected
    above -----
    for i=2:5
        X(:,i) = u1 + f.*(T(i-1,:))';
        X(:,i+N) = u1 - f.*(T(i-1,:))';
    end

    Z = sqrt((X(1,:) - X(3,:)).^2 + (X(2,:) - X(4,:)).^2);
    z = w1.*Z(:,1) + w0.*sum(Z(:,2:9));

    shi = w1.*(X(:,1) - u1).*(Z(:,1) - z);
    for j=2:9
        shi = shi + w0.*(X(:,j) - u1).*(Z(:,j) - z);
    end

    phi = w1.*(Z(:,1) - z).*(Z(:,1) - z);
    for j=2:9
        phi = phi + w1.*(Z(:,j) - z).*(Z(:,j) - z);
    end

    A = (shi')*(W1^(-1));
    b = z - A*u1;
    sigma = phi - A*W1*(A');

end
```

*Not enough input arguments.*

*Error in doSLR (line 10)*  
*X(:,1) = u1;*

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