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function [mu_y, Sigma_y, y_s] = approxGaussianTransform(mu_x, Sigma_x,
    f, N)
%approxGaussianTransform takes a Gaussian density and a transformation
%function and calculates the mean and covariance of the transformed
%density.
%Inputs
% MU_X [m x 1] Expected value of x.
% SIGMA_X [m x m] Covariance of x.
% F [Function handle] Function which maps a [m x 1] dimensional
% vector into another vector of size [n x 1].
% N Number of samples to draw. Default = 5000.
%Output
% MU_Y [n x 1] Approximated mean of y.
% SIGMA_Y [n x n] Approximated covariance of y.
% ys [n x N] Samples propagated through f
if nargin < 4
    N = 5000;
end
%Your code here
x_s=mvnrnd(mu_x,Sigma_x,N); % general form of function mvnrnd ( $\mu$ ,#)
y_s=f(x_s'); % Samples propagated through f
mu_y=mean(y_s,2); % Approximated mean of y
Sigma_y = 1/(N-1)*(y_s-mu_y)*(y_s-mu_y)'; % Approximated covariance of
% y.
end
```

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