

```
function [sml sml_gradient] = SML(x)
    mu_val = x(1);
    ln_sigma_val = x(2);

    global data V

    [sim_avg_cdf sim_avg_pdf sim_avg_pdf_u_im,X,Y,sigma_val]...
    = sim_avg_vals(mu_val,ln_sigma_val);

    % Calculate the negative of the SML:
    sml = - mean(Y.*log(sim_avg_cdf) + (1-Y).*log(1 - sim_avg_cdf));

    % Calculate the gradient
    % Note: dF/dx = dF/dlog(x) * dlog(x)/dx == > dF/dlog(x) = dF/dx * x
    if nargin > 1
        sml_gradient = -[mean((Y.*X.*sim_avg_pdf)./(sim_avg_cdf) -...
            ((1-Y).*X.*sim_avg_pdf)./(1-sim_avg_cdf));...
            mean((Y.*X.*sim_avg_pdf_u_im)./(sim_avg_cdf) -...
            ((1-Y).*X.*sim_avg_pdf_u_im)./(1-sim_avg_cdf))*sigma_val];
    end
end
```