

Extra Credit Project of ST755, Fall 2011

Due: Monday, 12/12/2011

1. In Class, we discussed the estimation of $f(t)$ in the following model

$$y_i \stackrel{ind}{\sim} f(y_i|\mu_i)$$
$$g(\mu_i) = f(t_i)$$

using a quadratic smoothing spline with $m = 1$, where $0 < t_1 < t_2 < \dots < t_n < 1$. In this case, the (i, j) th element of Σ is $\min(t_i, t_j)$ and $T = (1, 1, \dots, 1)^T$. Implement the ML-type of estimation for $f(t)$ with an approximate EM algorithm for binary data y with $n = 100$, $t_i = i/n$, $g(\mu) = \text{logit}(\mu)$ and $f(t) = 2\sin(2\pi t)$. Run a simulation study (with 200 runs) to compare the average of (200) estimated $f(t)$ to its true function. A function for generating Gaussian quadrature points and weights is attached.