Examples after update the sampling method

2019-08-28

Example 1

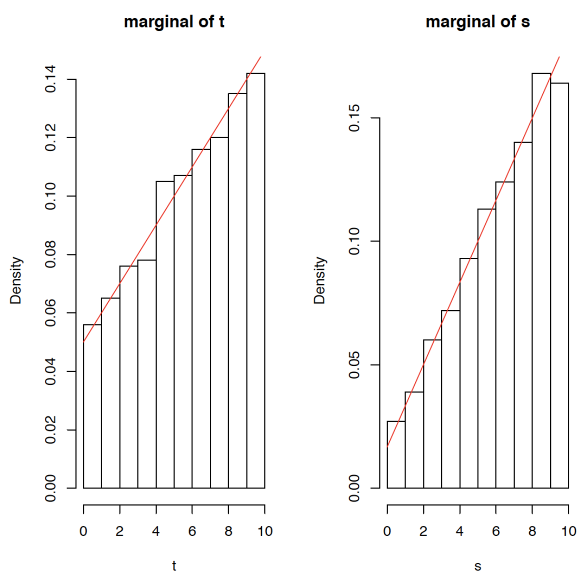
Suppose we simulate the data from the following joint distribution:

$$f(s,t) = \frac{1}{1000}(s+t)$$

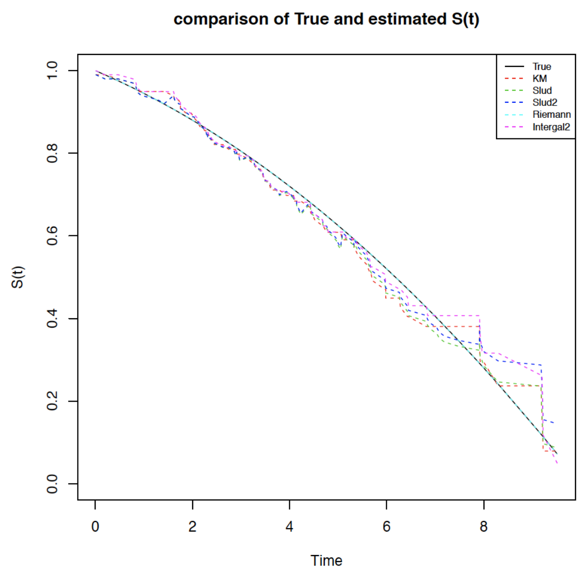
where $s \in (0,10)$ and $t \in (0,10)$.

Simulate data.

The marginal plots is:



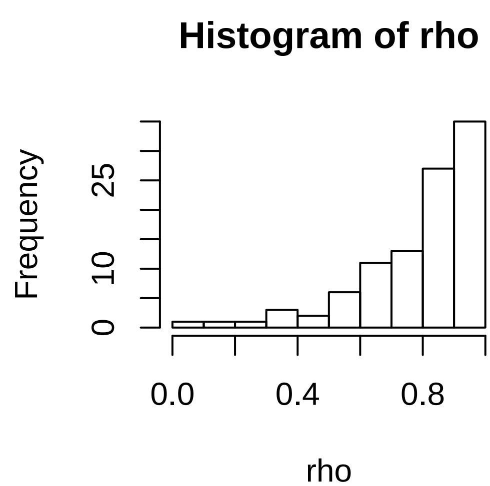
The estimation plot:



The mean abs difference

KM	Slud1	Slud2	Riemann	Integral
0.024	0.025	0.025	0	0.023

The distribution of true $\rho(t)$



Example 2 Tsiatis

The functions

Function	Description	Expression
$P(T < t, C < c)$	Joint CDF	$1 + exp(-\lambda t - \mu c - \theta tc) - exp(-\lambda t) - exp(-\mu c)$
$f(t, c)$	Joint PDF	$(\lambda\mu - \theta + \lambda\theta t + \mu\theta c + \theta^2 tc)exp(-\lambda t - \mu c - \theta ct)$
$f_t(t)$	Marginal PDF of T	$\lambda exp(-\lambda t)$

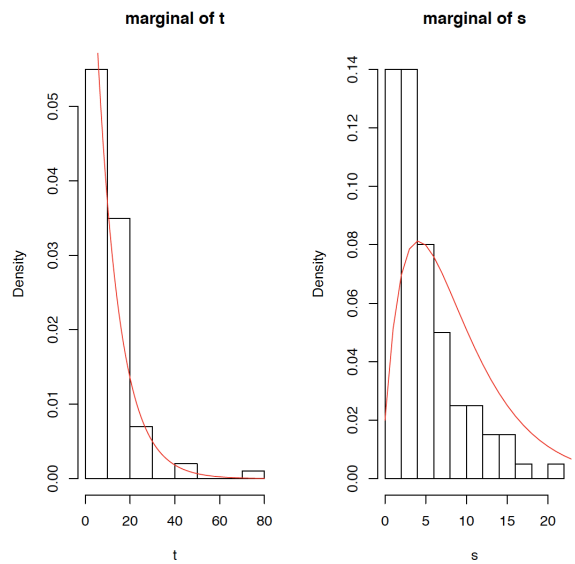
Function	Description	Expression
$S_t(t)$	Survival function of T	$exp(-\lambda t)$
$f_c(c)$	Marginal PDF of C	$\mu exp(-\mu c)$
$S_c(c)$	$P_c(C > c)$	$exp(-\mu c)$
$S_x(t)$	$P(T > t, C > t)$	$exp(-\lambda t - \mu t - \theta t^2)$
$\psi(t)$	$\int_t^{\infty} f(t, c)dc$	$(\lambda + \theta t)exp(-\lambda t - \mu t - \theta t^2)$

Parameter settings (consistent to Tsiatis's example):

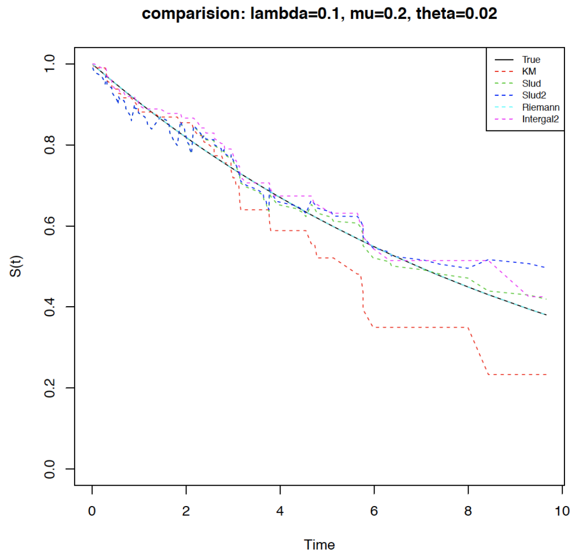
- scenario 1: $\lambda = 0.1, \mu = 0.2, \theta = 0.02$
- scenario 2: $\lambda = 1, \mu = 1, \theta = 1$

P.S. the problem here is tha the inverse function cannot be calculated. Just estimated.

The marginal plots is ($\lambda = 0.1, \mu = 0.2, \theta = 0.02$):



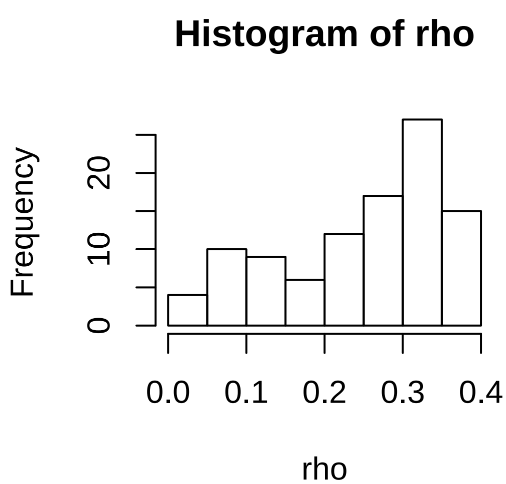
The estimation plot:



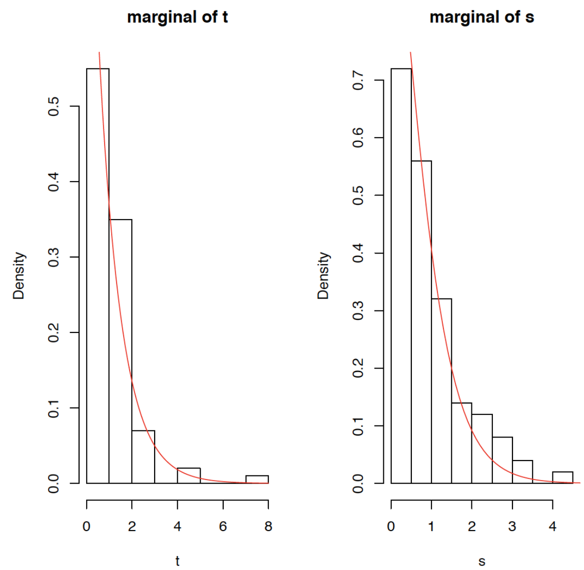
The mean abs difference

KM	Slud1	Slud2	Riemann	Integral
0.046	0.022	0.026	0	0.026

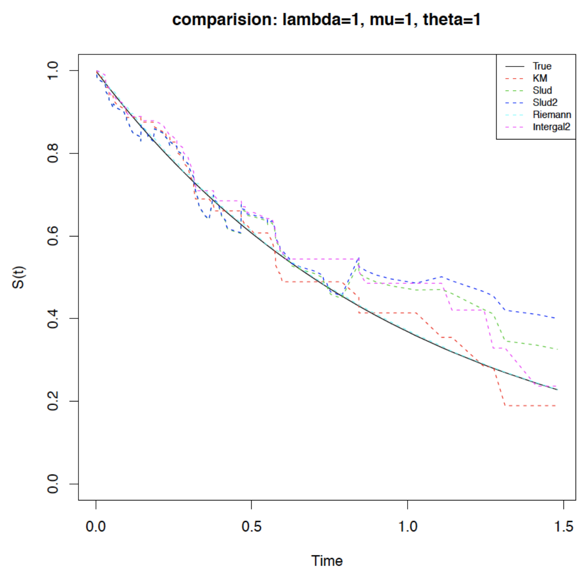
The distribution of true $\rho(t)$



The marginal plots is ($\lambda = 1, \mu = 1, \theta = 1$):



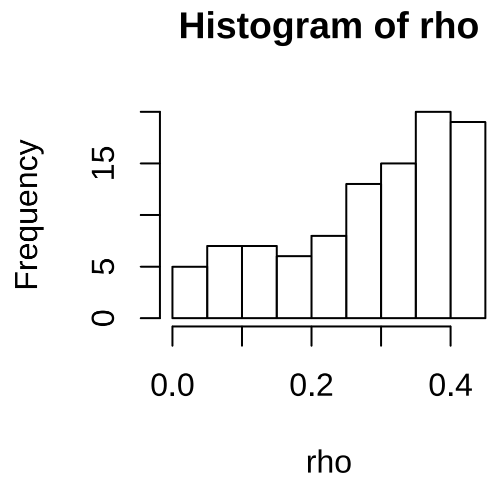
The estimation plot:



The mean abs difference

KM	Slud1	Slud2	Riemann	Integral
0.022	0.035	0.041	0.004	0.037

The distribution of true $\rho(t)$



Example 3: Piecewise