Field Exam

65 mins, 65 points. Points in parentheses.

1. (40) Consider a random variable y_i that is censored by an independently distributed random variable c_i. The econometrician observes a random sample of the pair (v_i, c_i) where $v_i = \max(y_i, c_i)$. Note the econometrician always observes the censoring variable, but does not always observe the censored variable y_i.

   Propose an estimator for the c.d.f of the random variable y_i, at a point, say t. State explicit conditions for your estimator to be root-n consistent and asymptotically normal.

2. (25) Consider the following partially linear model:

   $$y_i = x_i'\beta_0 + f(z_i) + \epsilon_i$$

   where y_i, x_i, z_i are observed, β_0 is an unknown vector, and $f(\cdot)$ is an unknown function. ϵ_i is an unobserved random variable, whose mean is 0 conditional on x_i, z_i.

   (a) Assume z_i is a dummy variable, taking the values 1 an 0. Propose an OLS estimator for β_0 and $f(\cdot)$, and informally discuss finite sample and asymptotic properties.

   (b) Now suppose z_i is continuously distributed, and one knows the functions $E[x_i|z_i]$ and $E[y_i|z_i]$. Propose an OLS estimator for β_0 and informally discuss its asymptotic properties.