Homework 4 (Due May 5 2017)

1. Consider observations $\{(U_i, \delta_i, Z_i), i = 1, \cdots, 6\} = \{(1, 1, Z_1), (1.5, 1, Z_2), (2, 0, Z_3), (4, 0, Z_4), (4.5, 1, Z_5), (6, 0, Z_6)\}$, where $U_i = \min(T_i, C_i), \delta_i = I(T_i \le C_i), 1 \le i \le 6$. Assuming that $T_i|Z_i$ follows a Cox regression model, i.e.,

$$h_T(t|Z_i) = h_0(t)e^{\beta' Z_i}, i = 1, \cdots, 6.$$

Write down the partial likelihood function based on observed data.

2. Suppose that $Z_1 = 0$, $Z_2 = 1$, $Z_3 = 2$, $Z_4 = 8$, $Z_5 = 1.5$ and $Z_6 = 3$ in the above question. Show that the partial likelihood function has NO finite maximizer. Does this example tells you the general conditions under which a finite maximum partial likelihood estimator does NOT exist? (You don't need to give detailed justification for the condition.)