Group Project 1

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2024-02-14

Design a set of distributions/models under both proportional-hazard and non-proportional-hazard assumptions

proportional-hazard

The Cox proportional hazards model does not assume a particular baseline hazard function $h_0(t)$ but the proportional relation between groups and baseline.

$$h_i(t) = h_0(t) \exp[\beta_1 X_{i1} + \beta_2 X_{i2} + \ldots + \beta_p X_{ip}]$$

non-proportional-hazard

The Weibull proportional hazards model assumes a specific functional form for the hazard rate, which can either increase or decrease over time. Its shape parameter distinctly describes whether the hazard rate is increasing, decreasing, or constant.

$$h_i(t) = \lambda\gamma t^{\gamma-1} \exp[\beta_1 X_{i1} + \beta_2 X_{i2} + \ldots + \beta_p X_{ip}]$$

where λ is the scale parameter, and γ is the shape parameter.