Adaptive Methods in Clinical Research

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1 Notation

- Index for patient is i
- Index for arm is k (where $k = 0$ denotes control and $k > 1$ denotes an experimental arm)
- Index for stage is j
- Notation for unknown parameters μ_k (mean) or p_k (probability of success)
- Notation for the parameter of interest is θ (e.g., $\theta = \mu_k - \mu_0$)
- Interesting treatment effect is δ
- Uninteresting treatment effect is δ_0
- Notation for the lower bound is l
- Notation for the upper bound is u
- Notation for the endpoint is Y
- Number of patients per arm per stage is n
- Number of patients as a random variable is N
- Maximum number of patients is n_{max}
- Notation for standard deviation is σ
- Notation for treatment (arm) is T
- Notation for total number of experimental treatments (arms) is K
- Notation for the randomisation ratio to arm k is $R_k = \frac{N_k}{n}$
- Notation for treatment assignment variable $a_{k,i}$ (taking value 1 if patient i receives treatment arm k)
- $\mathbb{1}_A(x) \stackrel{\text{def}}{=} \begin{cases} 1 & \text{if } x \in A \\ 0 & \text{if } x \notin A \end{cases}$
- $E(.)$ denotes expected value.
- Notation for sequence of assignments up to patient i is $a_k^{(i)}$, where $a_k^{(i)} = \{a_{k,1}, \ldots, a_{k,i}\}$
- Notation for sequence of endpoint observations up to patient i is $Y^{(i)}$ where $Y^{(i)} = \{Y_1, \ldots, Y_i\}$
- Notation for test statistic on endpoint and assignment data up to patient i $T(Y^i, \mathbf{A}^i)$ with $\mathbf{A}^i = [a_0^i; a_1^i; \ldots; a_k^i]$

2 Glossary

- Benefit (c.f. "futility")
- Conditional power
- Expected sample size under the null hypothesis H0 (ESS(H0)).
- Futility (c.f. "benefit)
- Interim analysis
- Mander and Thompson design
- Minimax
- Non-stochastic curtailment
- Optimal (Simon design only)