

ST414: Advanced Topics in Statistics

Asymptotic Statistics

Lectures 5, 6, 7

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What we've seen in the previous lecture...

- A d -dimensional random variable $Y = (Y_1, \dots, Y_d)$.
- Moment generating function:

$$M_Y(t) = E \{ \exp(t_1 Y_1 + \dots + t_d Y_d) \} \quad \|t\| < t_0, t_0 > 0.$$

- Joint moments and cumulants of order r are partial derivatives of the $M_Y(t)$ and $K_Y(t) = \log M_Y(t)$ at $t = 0$.
- Joint cumulants in terms of moments.
- Exponential families for random d -vector Y and p -vector of parameters β .
- (Stochastic) asymptotic expansions.
- Haldane-Anscombe correction for the estimation of log-odds.

What's next...

Likelihood-based asymptotics

- Consistency, asymptotic normality and asymptotic efficiency of the MLE.
- Fundamental asymptotic expansions.
- Can we do better than the MLE?
- Approximate pivots of Chapter 1: how they result and how can we do better.