07: EXPONENTIAL FAMILIES

Rice 8.8.1
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1 Exponential Families

Many "nice" distributions that we've spent a lot of time with are members of the **exponential family**.

> **Exponential Family**
>
> One-parameter members of the exponential family have density functions of the form:

Writing densities in this form requires a bit of work.

Example: Poisson distribution

BUT, the payoff is that once we write the pdf in *exponential form*, we can immediately identify a sufficient statistic:

We also have the following results:

> **Sufficiency and the MLE**

> **Mean and Variance of Exponential Families**

> **Conjugate priors**

Example: Poisson distribution

> ### k-parameter exponential family

Example: $X_1, ..., X_n \sim N(\mu, \sigma^2)$

1.1 More distributions