Condensed Bishop

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Introduction

These are my condensed notes from Bishop's **Pattern Recognition and Machine Learning[^Bishop's Pattern Recognition and Machine Learning].**

THIS IS A WORK IN PROGRESS

Section 2.4 The Exponential Family

The exponential family of functions can be generalized as:
$p(\mathbf{x}|\eta) = h(x)g(\eta)e^{\eta^T u(x)}$

Where:

- Where $h(x)$ is ??
- And $g(\eta)$ is the coefficient that ensures the distribution is normalized.
- And $u(x)$ is som function of x

The generalized form of the likelihood estimator function for the exponential family of functions is:

$p(\mathbf{x}|\eta) = \prod_{n=1}^{N} h(x_n)g(\eta)^N e^{\eta^T \sum_{n=1}^{N} u(x_n)}$

```
x <- seq(-4, 4, length = 100)
hx <- dnorm(x)

degf <- c(1, 3, 8, 30)
colors <- c("red", "blue", "darkgreen", "gold",
    "black")
labels <- c("df=1", "df=3", "df=8", "df=30", "normal")

plot(x, hx, type = "l", lty = 2, xlab = "x value",
    ylab = "Density", main = "Comparison of t Distributions")

for (i in 1:4) {
    lines(x, dt(x, degf[i]), lwd = 2, col = colors[i])
}
```

```
legend("topright", inset = 0.05, title = "Distributions",
    labels, lwd = 2, lty = c(1, 1, 1, 1, 2), col = colors)
```

[^Bishop's Pattern Recognition and Machine Learning]: `http://www.rmki.kfki.hu/~banmi/elte/Bishop%20-%20Pattern%20Recognition%20and%20Machine%20Learning.pdf`

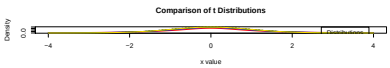

Figure 1: Normal Distribution

$$\frac{d}{dx}\left(\int_0^x f(u)\,du\right) = f(x).$$

Figure 2: An equation

This is a margin note. Notice that there isn't a number preceding the note.