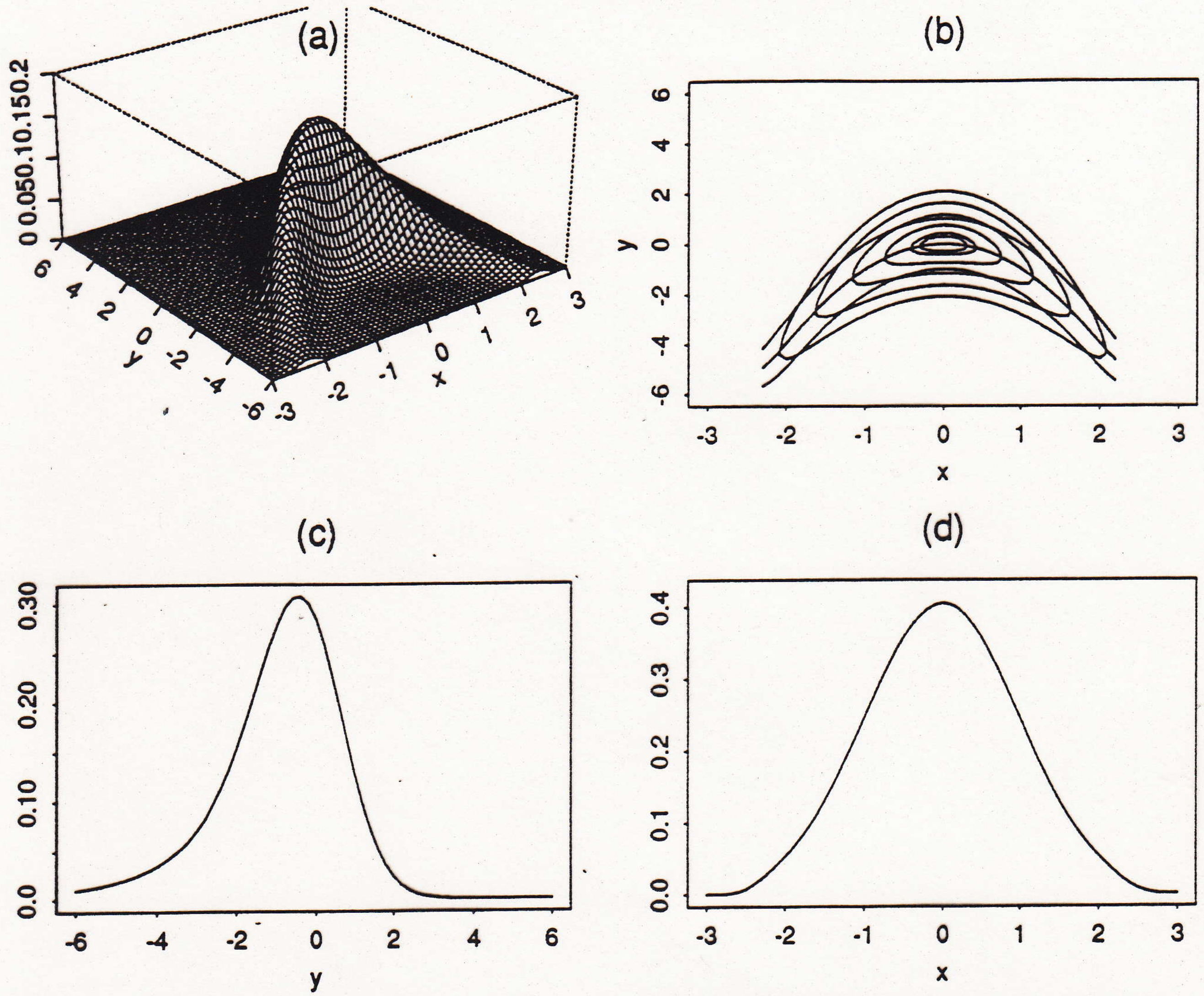

Figure 3.6. The Distribution of a Quadratic Regression with Normal Errors. The density is $f_{X,Y}(x,y) = f_{Y|X}(y|x)f_X(x)$ where $f_{Y|X}(y|x)$ is normal with mean $g(x) = -x^2$ and variance $\sigma^2_{Y|X} = 1$, and $f_X(x)$ is normal with mean $\mu_X = 0$ and $\sigma^2_X = 1$. Panel (a) is a perspective plot of $f_{X,Y}(x,y)$. Panel (b) is a contour plot of $f_{X,Y}(x,y)$. The lines shown in Panel (b) are $\mathcal{E}(Y|X)(x)$ (center), $\mathcal{E}(Y|X)(x)$ plus one standard deviation of $f_{Y|X}(y|x)$ (top), and $\mathcal{E}(Y|X)(x)$ minus one standard deviation of $f_{Y|X}(y|x)$ (bottom). Panel (c) is a plot of $f_Y(y)$. Panel (d) is a plot of $f_X(x)$.