(4) $y\cdot\sin x-\cos(x-y)=0$

$$y\,d\sin x+\sin x\,dy+\sin(x-y)\,d(x-y)=0$$

$$y\cdot\cos x\,dx+\sin x\cdot dy+\sin(x-y)(dx-dy)=0$$

$$[y\cdot\cos x+\sin(x-y)]\,dx+[\sin x-\sin(x-y)]\,dy=0$$

$$\frac{dy}{dx}=-\frac{y\cdot\cos x-\sin(x-y)}{\sin x-\sin(x-y)}.$$

P.95.9 求下列隐函数在指定点M的导数。

(1) $y^2-2xy-x^2+2x-4=0$, $M(3,7)$

解: $2y\,dy-2x\,dy-2y\,dx-2x\,dx+2\,dx=0$

$$(-2y-2x+2)\,dx=2(x-y)\,dy$$

$$\frac{dy}{dx}=\frac{1-x-y}{x-y},\quad \left.\frac{dy}{dx}\right|_{(3,7)}=\frac{1-3-7}{3-7}=\frac{9}{4}$$

(2) $e^{xy}-5x^2y=0$, $M\left(\frac{e^2}{10},\frac{20}{e^2}\right)$

解: $e^{xy}d(xy)-5(x^2dy+y\,dx^2)=0$

$$e^{xy}(x\,dy+y\,dx)-5(x^2dy+2xy\,dx)=0$$

$$(xe^{xy}-5x^2)\,dy=(10xy-ye^{xy})\,dx$$

$$\frac{dy}{dx}=\frac{10xy-ye^{xy}}{x\cdot e^{xy}-5x^2},\quad \left.\frac{dy}{dx}\right|_{\left(\frac{e^2}{10},\frac{20}{e^2}\right)}=\frac{10\times 2-\frac{20}{e^2}\cdot e^2}{\frac{e^2}{10}\cdot e^2-5\left(\frac{e^2}{10}\right)^2}=0$$

P.95.10 设 $y=f(x)$ 由下列参数方程给出，求 y', y''。

(1) $\begin{cases}x=2t-t^2\\ y=3t-t^3.\end{cases}$ $x'(t)=2-2t$, $y'(t)=3-3t^2$

$$\frac{dy}{dx}=\frac{y'(t)}{x'(t)}=\frac{3-3t^2}{2-2t}=\frac{3}{2}(1+t)$$

$$\frac{d^2y}{dx^2}=\frac{d}{dt}\frac{3}{2}(1+t)\cdot\frac{1}{\frac{dx}{dt}}=\frac{3}{2}\cdot\frac{1}{2-2t}=\frac{3}{4}\cdot\frac{1}{1-t}$$

(2) $\begin{cases}x=t\cdot\ln t\\ y=e^t\end{cases}$, $x'(t)=\ln t+t\cdot\frac{1}{t}=1+\ln t$

$$y'(t)=e^t$$

$$\frac{dy}{dx}=\frac{y'(t)}{x'(t)}=\frac{e^t}{1+\ln t}$$

$$\frac{d^2y}{dx^2}=\left(\frac{e^t}{1+\ln t}\right)'_t\cdot\frac{1}{\frac{dx}{dt}}=\frac{e^t(1+\ln t)-\frac{1}{t}\cdot e^t}{(1+\ln t)^2}=\frac{e^t(t+t\ln t-1)}{t(1+\ln t)^2}.$$