110.2

(2) $(x^2+y^2-x)(2x-x^2-y^2)\geq 0$ 且 $2x-x^2-y^2\neq 0$

$\therefore D(f)=\{(x,y)\mid (x-\frac{1}{2})^2+y^2\geq \frac{1}{4}$ 且 $(x-1)^2+y^2<1\}$

(4) $\frac{x}{y^2}\in[-1,1]$, $1-y\in[-1,1]$ $\therefore D(f)=\{(x,y)\mid 0\leq y\leq 2, -y^2\leq x\leq y^2\}$.

(5) $x\ln(y-x)>0$, $y-x>0$ $\therefore D(f)=\{(x,y)\mid x>0$ 且 $y>1+x$ 或 $x<0, 0<y-x<1\}$

110.3

(2) $x^2\leq y\leq\sqrt{x}$ $x\in[0,1]$

110.4

(2). $\cancel{x+y=u,\ x-y=v}$ $\Rightarrow$ $\cancel{\begin{cases} x=\frac{1}{2}(u+v) \\ y=\frac{1}{2}(u-v)\end{cases}}$ 令 $\begin{cases} x=u+v \\ y=u-v \\ z=uv \end{cases}$ $\therefore f(x,y,z)=(u+v)^{uv}+uv^{2u}$

$=f(u+v,u-v,uv)$

$\therefore f(x+y,x-y,xy)=(x+y)^{xy}+xy^{2x}$.

(3) 令 $\begin{cases} x+y=u \\ \frac{y}{x}=v \end{cases}$ $\Rightarrow$ $\begin{cases} x=\frac{u}{1+v} \\ y=\frac{uv}{1+v} \end{cases}$ $\therefore f(u,v)=(\frac{u}{1+v})^2-\frac{u^2v^2}{(1+v)^2}$.

$\therefore f(x,y)=\frac{u^2(1-v)(1+v)}{(1+v)^2}=\frac{u^2(1-v)}{1+v}=\frac{1-y}{1+y}x^2$.

110.5

$f(tx,ty)=t^k f(x,y)$ $\forall t$

$f(x\cdot 1, x\cdot\frac{y}{x})=x^k f(1,\frac{y}{x})=x^k F(\frac{y}{x})$