Homework4

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Problem1

$$\min_{x,y} x^2+y^2$$

$$s.t\ x+y=1.$$

$$\Rightarrow L(x,y,v)=x^2+y^2+v(x+y-1)$$

$$\Rightarrow d(v)=\inf_{x,y}(x^2+y^2+v(x+y-1))$$

$$=\inf_{x,y}\left[(x+\frac{v}{2})^2+(y+\frac{v}{2})^2-\frac{v^2}{2}-v\right]$$

$$=-\frac{v^2}{2}-v \quad (v=-2x,\ v=-2y).$$

$$\Rightarrow \text{Dual problem: } \max_{v} -\frac{v^2}{2}-v.$$