6.1.1.对于几何分布$Ge(p)$有$EX = \frac{1}{p}$

则矩估计方程组为$\frac{1}{p} = \overline{X}$

即$p = \frac{1}{\overline{X}}$

6.1.3.对于二项分布$b(m, p)$有$EX = mp$

由于m已知，则矩估计方程组为$mp = \overline{X}$

即为$p = \frac{\overline{X}}{m}$

6.1.4.对于二项分布$b(m, p)$有$EX = mp, VarX = mp(1 - p)$

则矩估计方程组为$\begin{cases} mp = \overline{X} \\ mp(1 - p) = S^2 \end{cases}$

解得$\begin{cases} p = 1 - \frac{S^2}{\overline{X}} \\ m = [\frac{\overline{X}^2}{\overline{X} - S^2}] \end{cases}$

6.1.6.对于均匀分布$U(0, \theta)$有$EX = \frac{\theta}{2}$

则矩估计方程组为$\frac{\theta}{2} = \overline{X}$

即$\theta = 2\overline{X}$

6.1.7.对于正态分布$N(\mu, \sigma^2)$有矩估计$\mu = \overline{X} = 74.002, \sigma^2 = S^2 = 6 \times 10^{-6}$

6.2.2.对数似然函数$lnL(\theta) = \frac{n}{2}ln\theta + \Sigma_{i=1}^{n} lnx_i \sqrt{\theta} - \Sigma_{i=1}^{n} lnx_i$

则对数似然函数的一阶导数$\frac{dlnL(\theta)}{d\theta} = \frac{n}{2\theta} + \frac{\Sigma_{i=1}^{n} lnx_i}{2\sqrt{\theta}}$

当$\frac{dlnL(\theta)}{d\theta} = 0$时, 解得$\theta = \frac{n^2}{(\Sigma_{i=1}^{n} lnx_i)^2}$

经检验，这个值确为原函数的极大值点

因此$\theta = \frac{n^2}{(\Sigma_{i=1}^{n} lnx_i)^2}$

6.2.3.对数似然函数$lnL(p) = ln\Pi_{i=0}^{n} C_m^x + \Sigma_{i=0}^{n} xlnp + (nm - \Sigma_{i=1}^{n} x)ln(1 - p)$

则对数似然函数的一阶导数$\frac{dlnL(p)}{dp} = \frac{\Sigma_{i=1}^{n} x}{p} - \frac{nm - \Sigma_{i=1}^{n} x}{1-p}$

二阶导数$\frac{d^2lnL(p)}{dp^2} = -\frac{\Sigma_{i=1}^{n} x}{p^2} - \frac{nm - \Sigma_{i=1}^{n} x}{(1-p)^2} < 0$恒成立

因此，当$\frac{dlnL(p)}{dp} = 0$时$lnL(p)$有最大值

解得$p = \frac{\Sigma_{i=1}^{n} x}{nm}$

6.2.4.对数似然函数$lnL(\theta) = \Sigma_{i=1}^{n} lnx_i - \frac{\Sigma_{i=1}^{n} x_i^2}{2\theta} - nln\theta$

则对数似然函数的一阶导数$\frac{dlnL(\theta)}{d\theta} = \frac{\Sigma_{i=1}^{n} x_i^2}{2\theta^2} - \frac{n}{\theta}$

当$\frac{dlnL(\theta)}{d\theta} = 0$时, 解得$\theta = \frac{\Sigma_{i=1}^{n} x_i^2}{2n}$

经检验，这个值确为原函数的极大值点

因此$\theta = \frac{n^2}{(\Sigma_{i=1}^{n} lnx_i)^2}$

6.2.7.正态分布对于μ和σ^2的极大似然估计分别为$\overline{X}$和S^2

因此$\mu = 74.002, \sigma^2 = 6 \times 10^{-6}$