SNM_HW02

PB19111713钟颖康

2.7

令$g=\frac{1}{f},y=\frac{1}{x}$，则有$g=ay+b$

根据给出的数据可得

y	0.4762	0.4	0.3571	0.3125
g	1.6428	1.4601	1.3572	1.2329

$$\begin{bmatrix}0.4672 & 1\\ 0.4 & 1\\ 0.3571 & 1\\ 0.3125 & 1\end{bmatrix}\begin{bmatrix}a\\ b\end{bmatrix}=\begin{bmatrix}1.6428\\ 1.4601\\ 1.3572\\ 1.2329\end{bmatrix}$$

法方程组为

$$\begin{bmatrix}0.6119 & 1.5458\\ 1.5458 & 4\end{bmatrix}\begin{bmatrix}a\\ b\end{bmatrix}=\begin{bmatrix}2.2363\\ 1.2329\end{bmatrix}$$

解得

$$a=2.49492$$
$$b=0.459089$$

6.8

$R_{1,1}=\frac{ln1+ln2}{2}=0.346574$，根据课本125页的$Romberg$算法可得积分数值表如下：

0.346574			
0.376019	0.385835		
0.383700	0.386260	0.386288	
0.385644	0.386292	0.386294	0.386294

故$I(lnx)=\int_1^2 lnxdx=0.386294$

6.10.(2)

因为要3阶代数精度，所以n = 2

根据课本131页的表格可知$x_1^{(2)}=-0.5773502692,x_2^{(2)}=0.5773502692,\alpha_1^{(2)}=\alpha_2^{(2)}=1$

故

$$
\begin{aligned}
G_n(f) &= \frac{b-a}{2}\sum_{i=1}^{n}\alpha_i^{(2)} f(\frac{(a+b)+(b-a)x_i^{(2)}}{2}) \\
&= 2\times\sum_{i=1}^{n}\alpha_i^{(2)} f(\frac{4x_i^{(2)}-2}{2}) \\
&= 2\times(f(\frac{4x_1^{(2)}-2}{2})+f(\frac{4x_2^{(2)}-2}{2})) \\
&= 2\times(f(-2.1547005384)+f(0.1547005384)) \\
&= -96.8889
\end{aligned}
$$