Chapter 6

P3

```
  0 1 0 0 1 1 0 0        0 1 1 0 1 0 0 1
+ 0 1 1 0 1 1 1 0        0 1 1 0 1 0 1 1
  ⌐0 1 1 1 0 1 0         1 1 0 1 0 1 0 0
+ 0 0 1 0 0 0 0 0        0 1 0 0 1 1 0 0
- 1 1 0 1 1 0 1 1        0 0 1 0 0 0 0 0
  0 1 1 0 0 0 0 1        0 1 1 1 1 0 0 1
  1 0 0 1 1 1 1 0 0      1 0 0 1 1 0 0 1
  0 0 1 1 1 1 0 0        1 0 0 1 1 0 1 0  溢出
+ 0 1 1 0 0 1 0 1        0 1 1 1 0 0 1 0
  1 0 1 0 0 0 1 0        0 0 0 0 1 1 0 0
```

P8

a.
$$E(p) = Np(1-p)^{N-1}$$
$$E'(p) = N(1-p)^{N-1} - Np(N-1)(1-p)^{N-2}$$
$$= N(1-p)^{N-2}((1-p) - p(N-1))$$

令 $E'(p) = 0$
$$p^* = \frac{1}{N}$$

b.
$$E(p^*) = N\frac{1}{N}(1-\frac{1}{N})^{N-1} = (1-\frac{1}{N})^{N-1} = \frac{(1-\frac{1}{N})^N}{1-\frac{1}{N}}$$

$$\lim_{N\to\infty}(1-\frac{1}{N}) = 1$$
$$\lim_{N\to\infty}(1-\frac{1}{N})^N = \frac{1}{e}$$

所以 $\lim_{N\to\infty} E(p^*) = \frac{1}{e}$

P9

$$E(p) = Np(1-p)^{2(N-1)}$$
$$E(p) = N(1-p)^{2(N-2)} - Np^{2(N-1)}(1-p)^{2(N-3)}$$
$$= N(1-p)^{2(N-3)}((1-p) - p^{2(N-1)})$$

令 $E'(p) = 0$
$$p^* = \frac{1}{2N-1}$$

$$E(p^*) = \frac{N}{2N-1} \left(1 - \frac{1}{2N-1}\right)^{2(N-1)}$$

$$\lim_{N \to \infty} E(p^*) = \frac{1}{2} \cdot \frac{1}{e} = \frac{1}{2e}$$

P13 一次轮询的时长: $N(Q/R + d_{poll})$

一次轮询传输的 bit 数: NQ

∴ 最大吞吐量 $\dfrac{NQ}{N(Q/R+d_{poll})} = \dfrac{R}{1 + \dfrac{d_{poll}R}{Q}}$

P17 对 10Mbps 来说: $\dfrac{512 \times 10^3 \, bits}{10 \times 10^6 \, bps} = 51.2 \, msec$

对 100Mbps 来说: $\dfrac{512 \times 10^3 \, bits}{10 \times 10^7 \, bps} = 512 \, \mu sec$