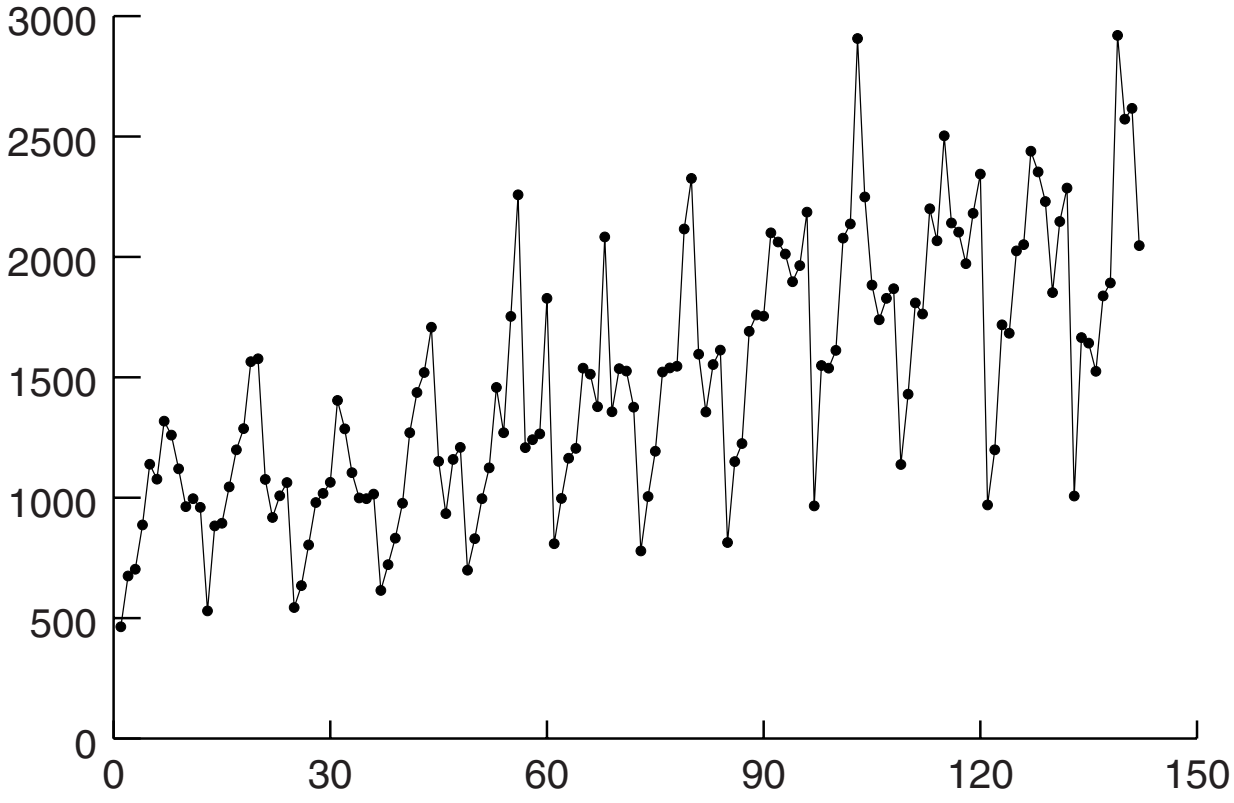
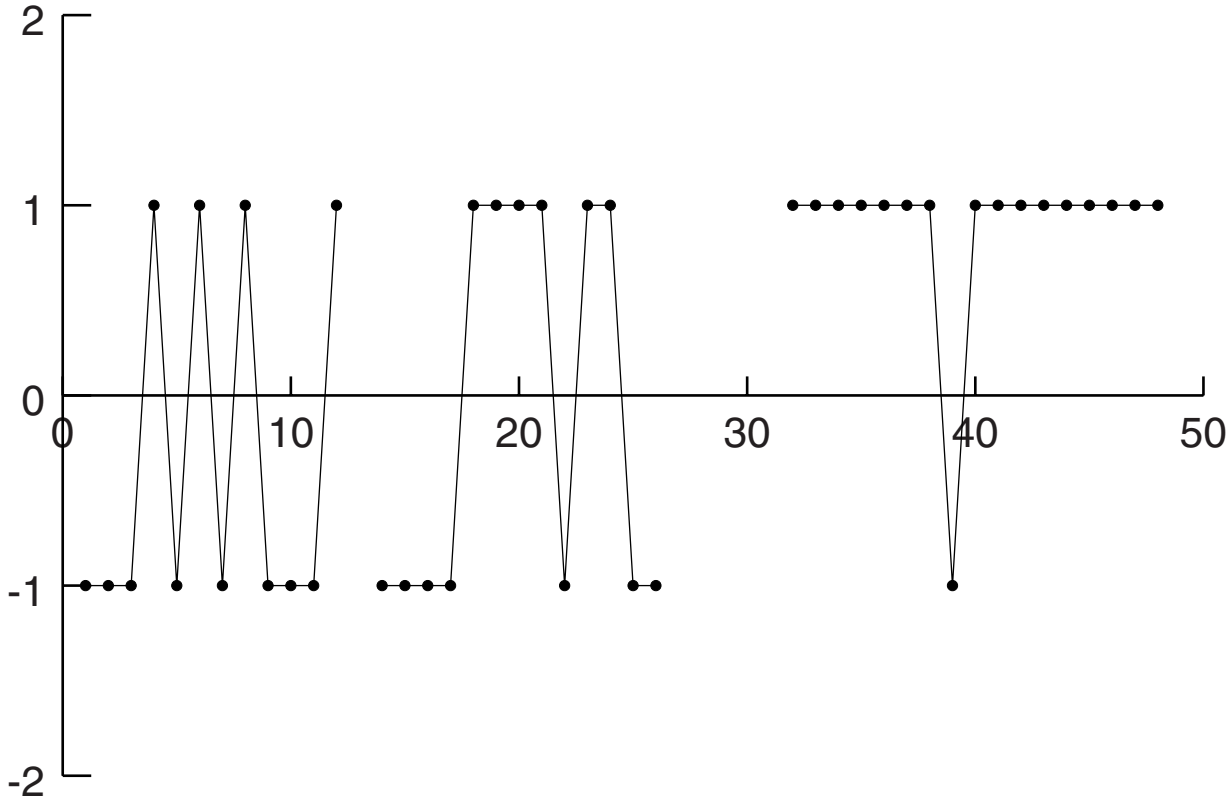
Example 1.1.1



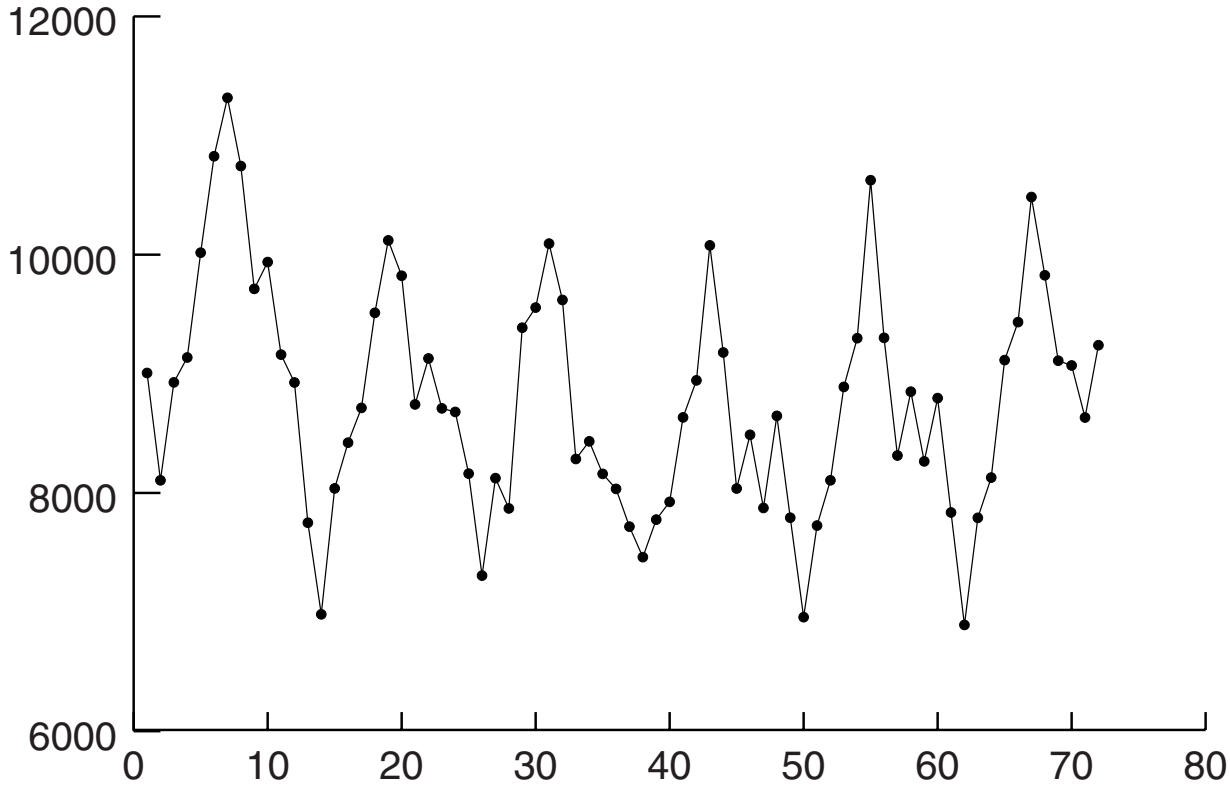
The Australian red wine sales, Jan.'80 - Oct.'91.

Example 1.1.2



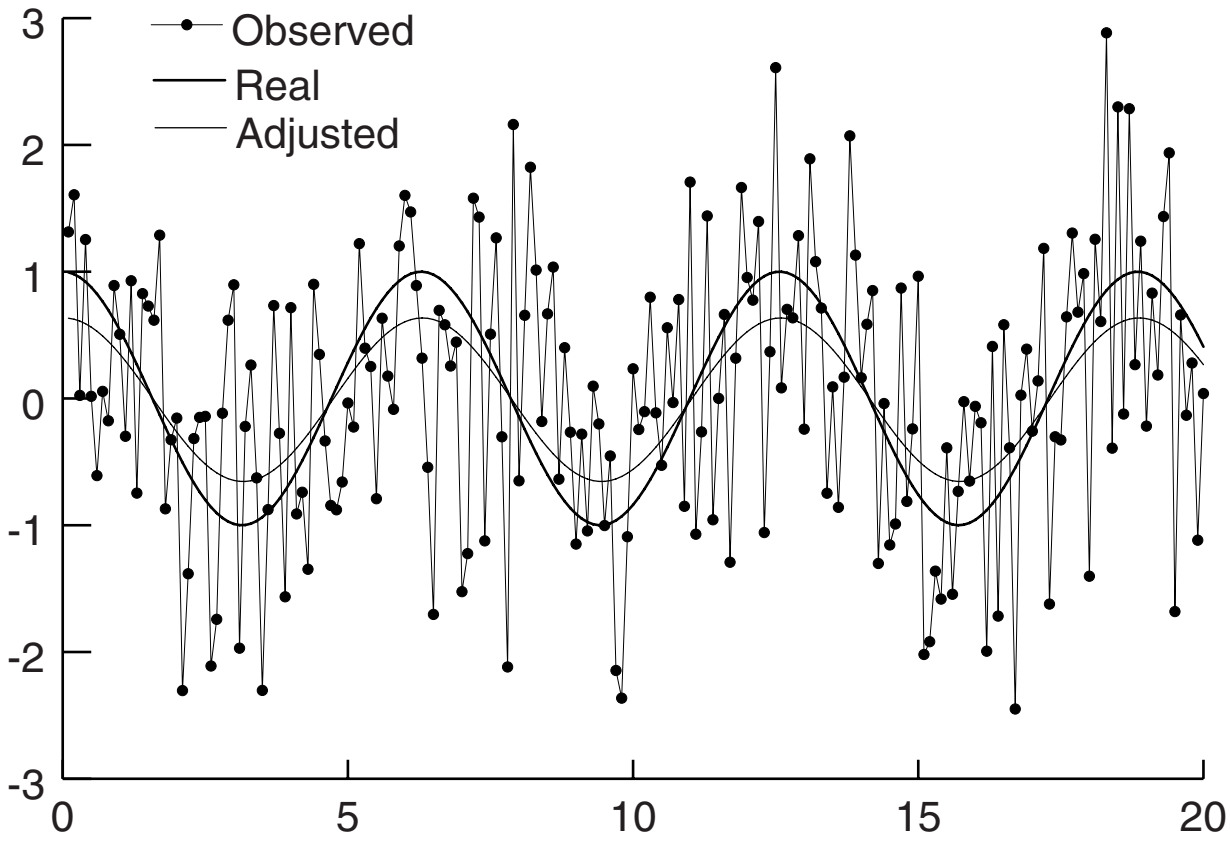
Results of the All-star basehall games

Example 1.1.3



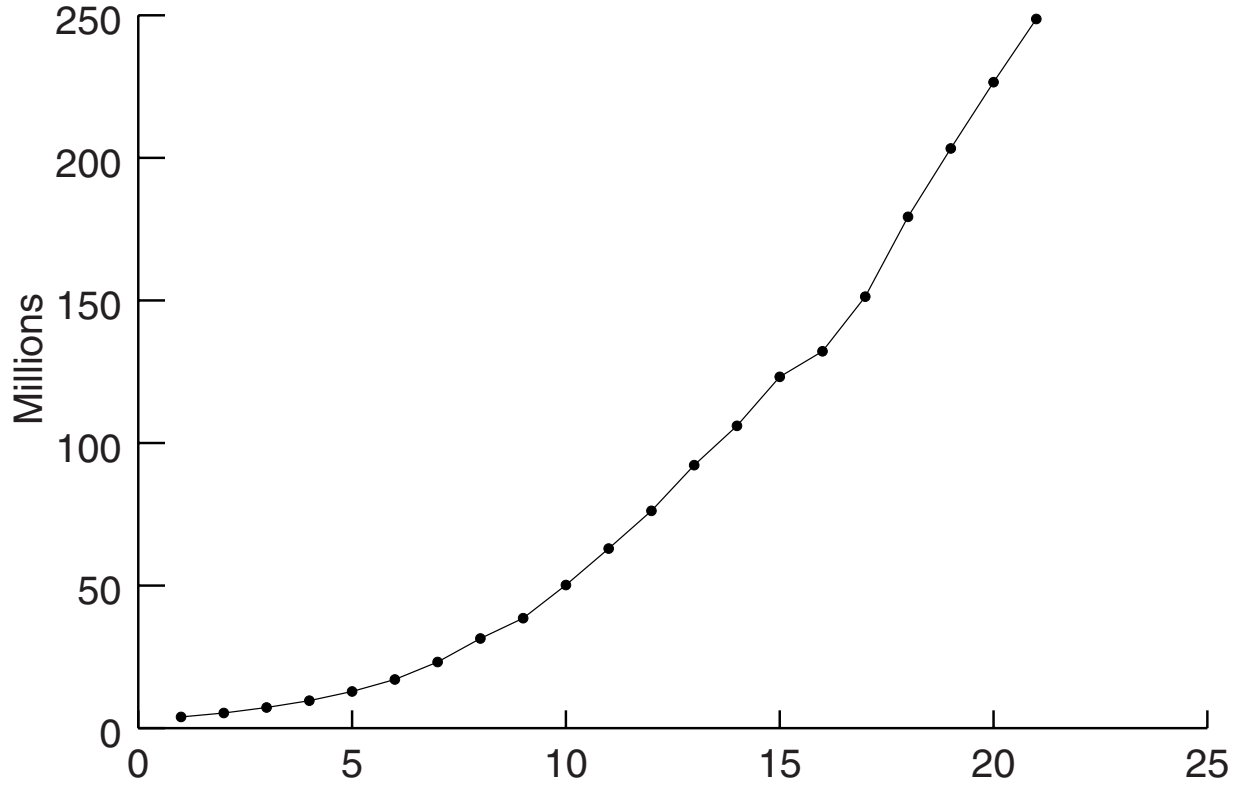
The monthly accidental deaths data, 1973-1978

Example 1.1.4



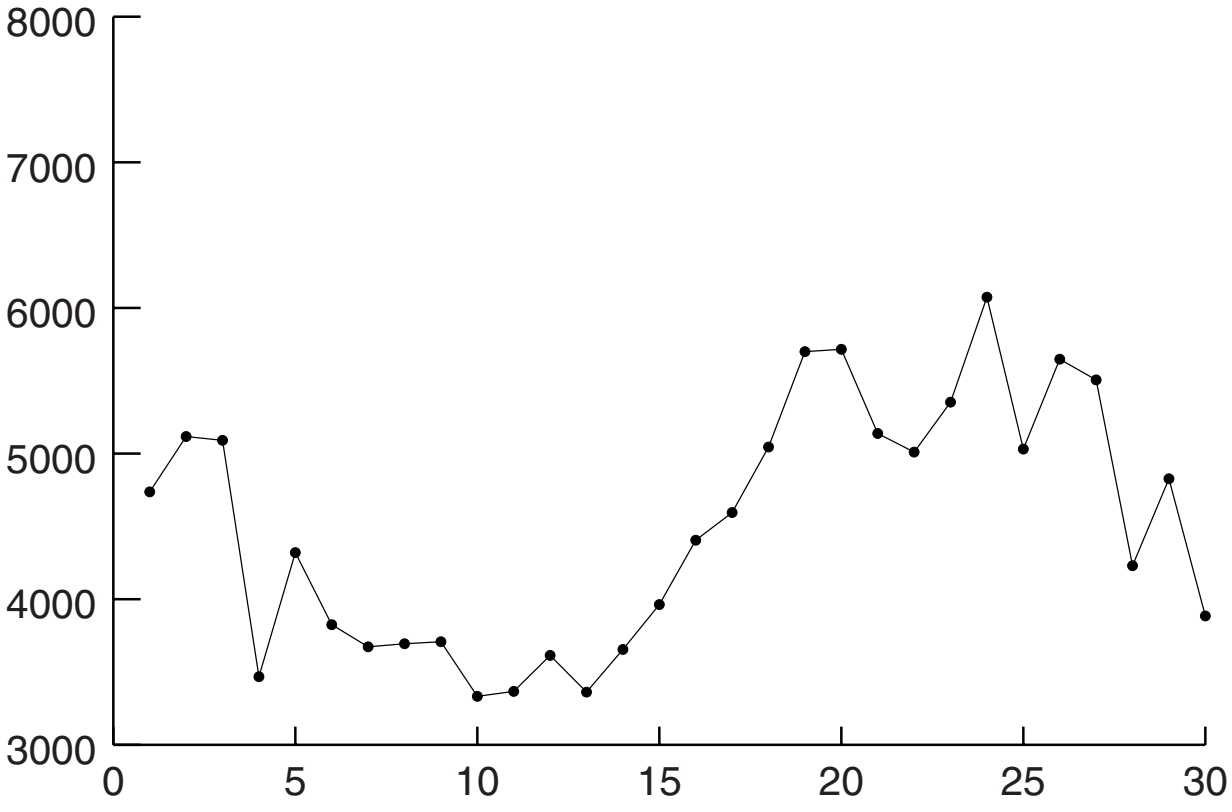
Signal detection

Example 1.1.5



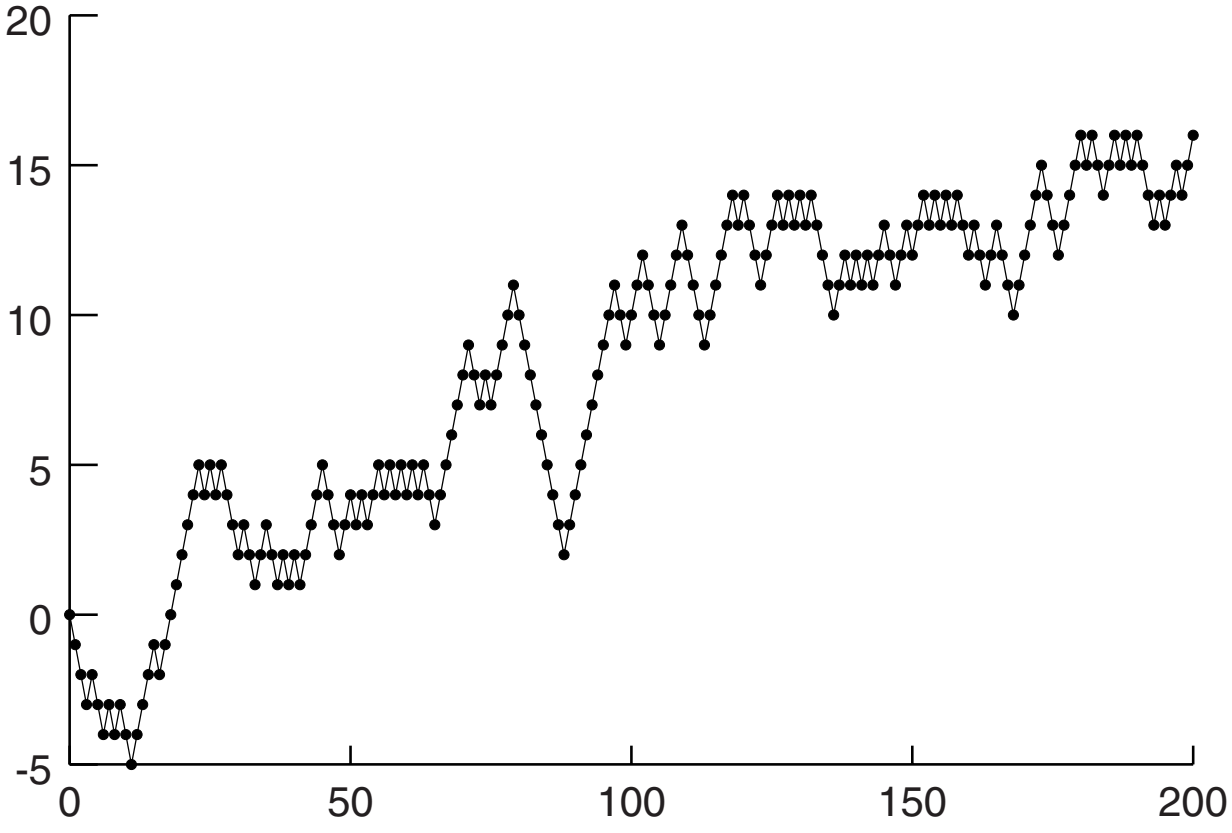
Population of the a U.S.A. at ten-year intervals, 1790-1990

Example 1.1.6



Strikes in the USA, 1950-1980

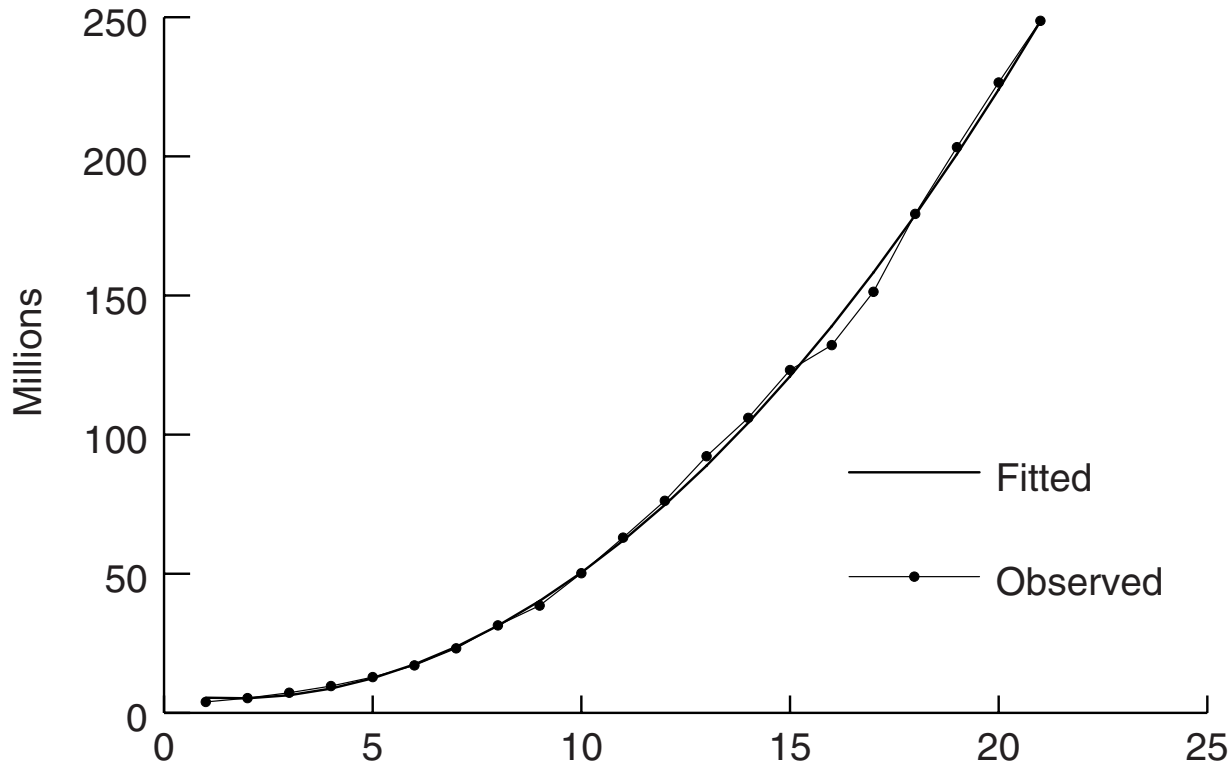
Example 1.3.3



One realization of a simple random walk

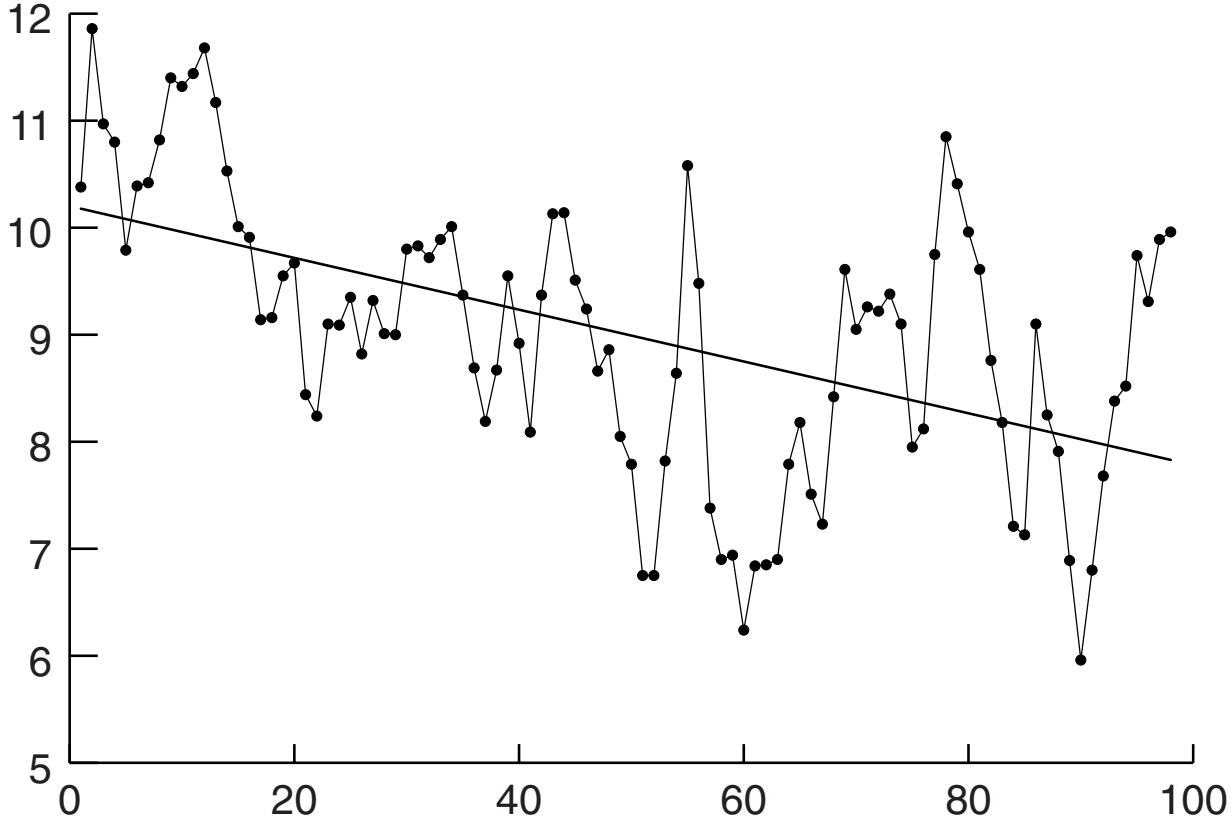
$\{S_t, t = 0, 1, 2, \ldots 200\}$

Example 1.3.4



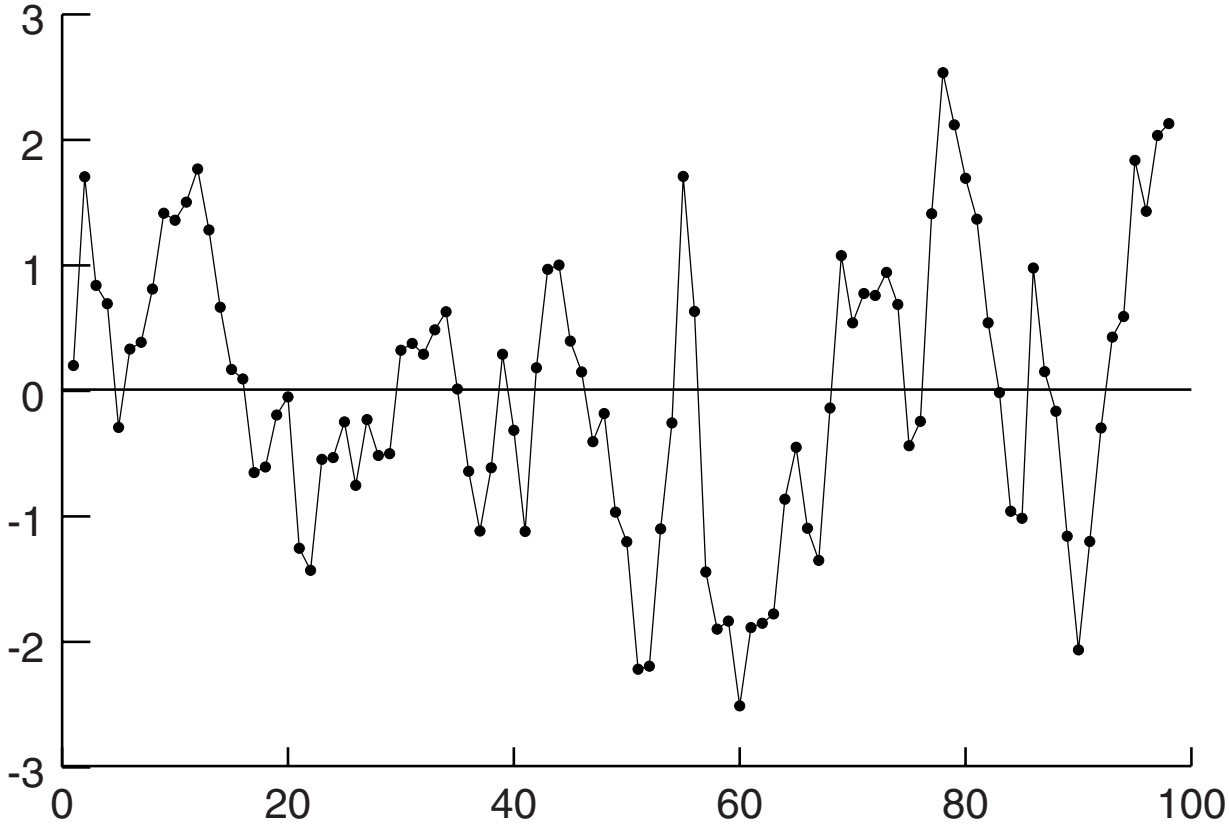
Population of the U.S.A. showing the quadratic trend fitted hy least squares

Example 1.3.5



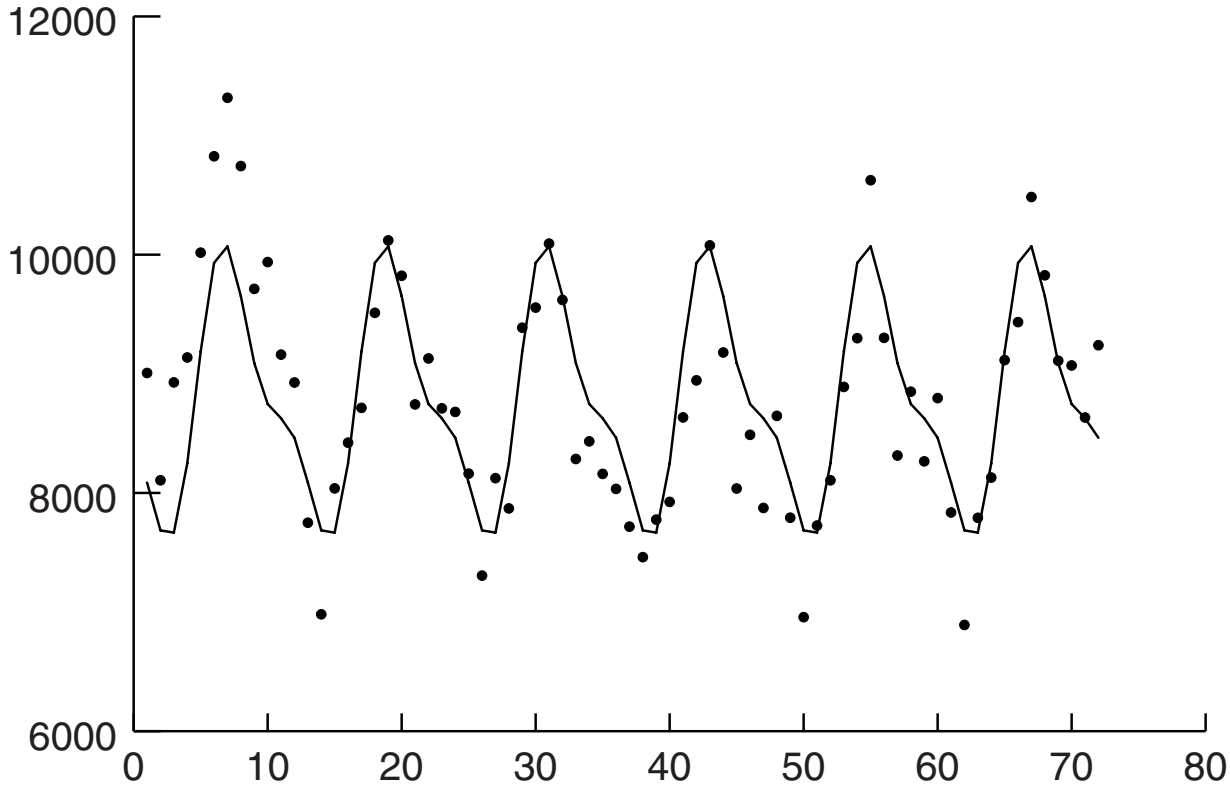
Level of Lake Huron 1875-1972 showing the line fitted by least squares

Example 1.3.5



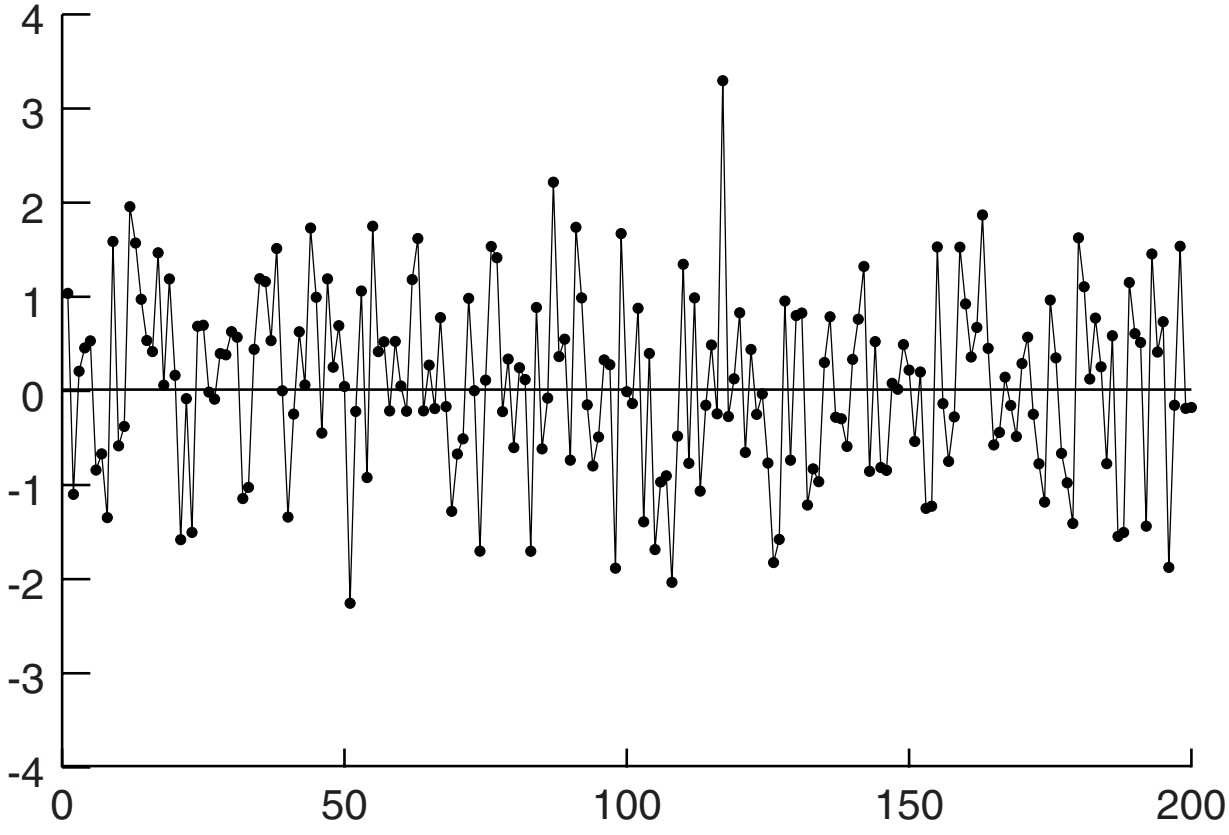
Residuals from fitting a line to the Lake Huron data

Example 1.3.6



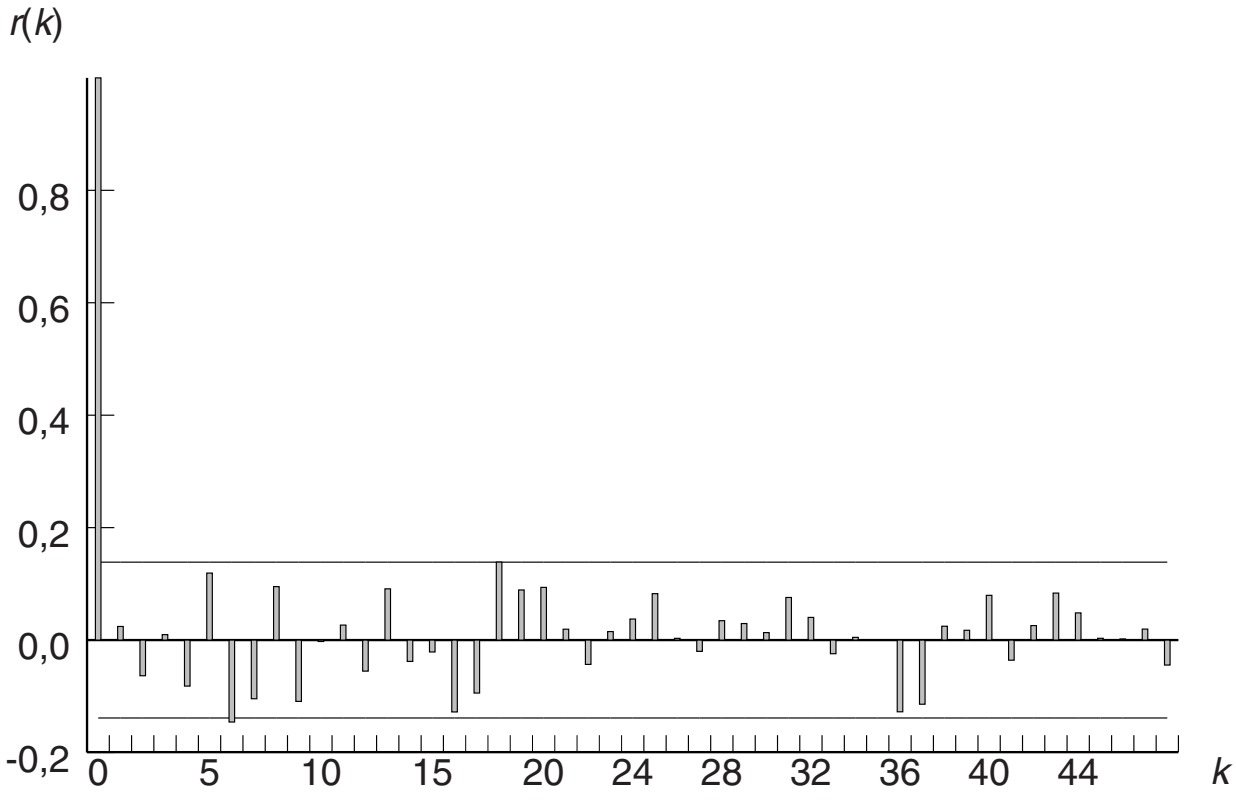
The estimated harmonic component of the accidental deaths data

Example 1.4.6



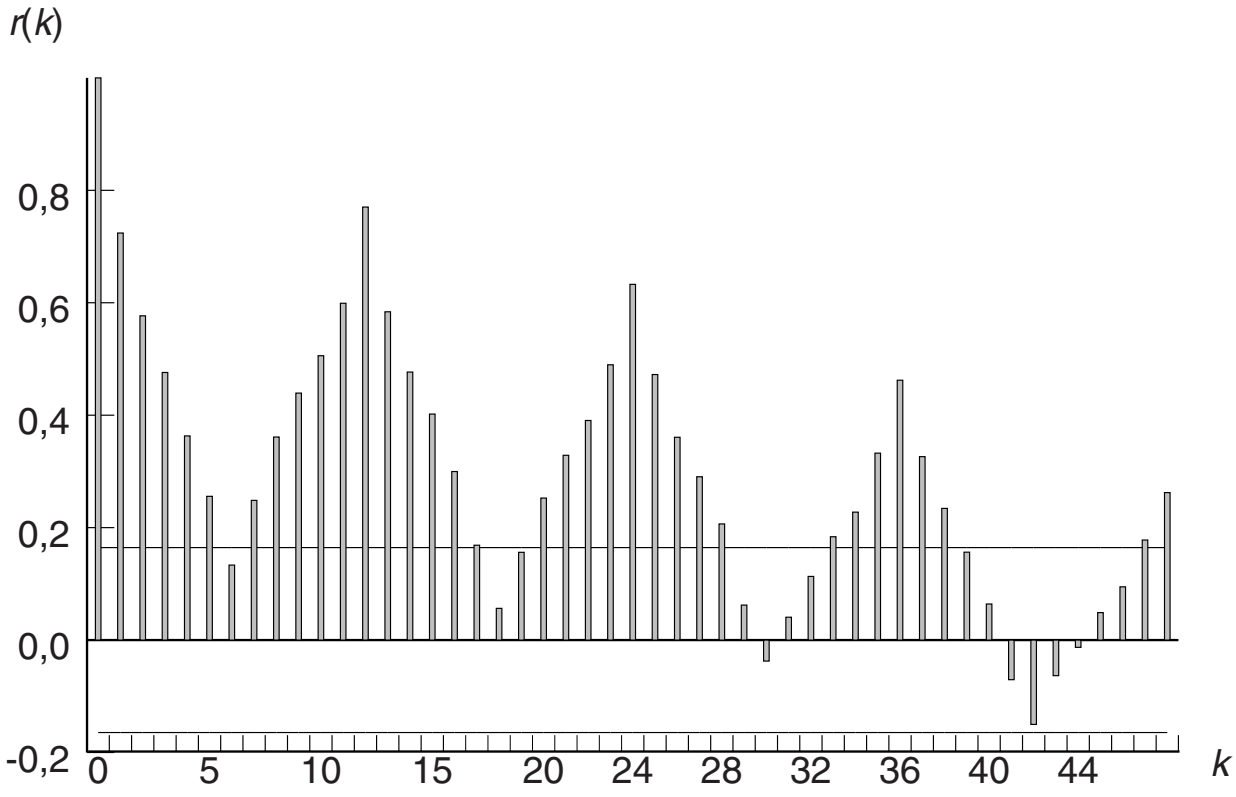
200 simulated values of IID$\mathcal{N}(0, 1)$ noise

Figure 1.13



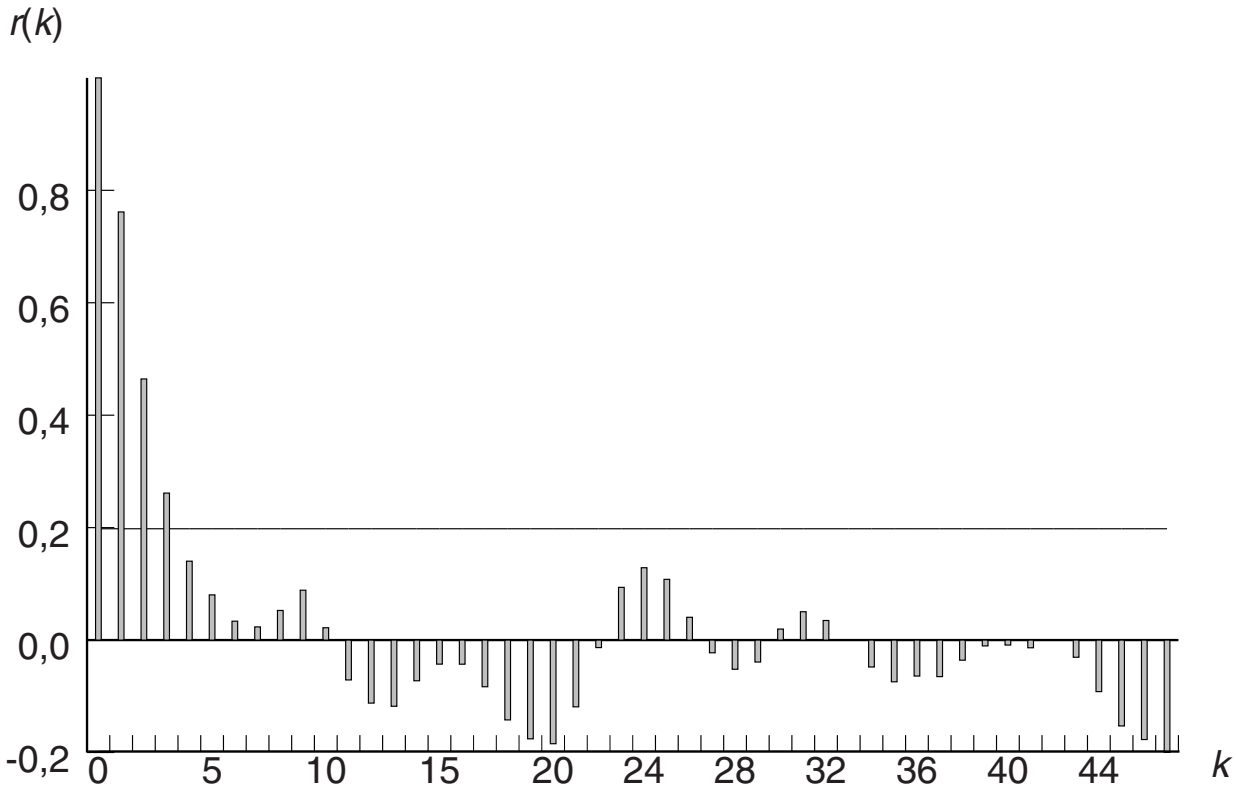
The sample autocorrelation function for the data of Figure 1.12 showing the bounds $\pm 1.96/\sqrt{n}$

Figure 1.14



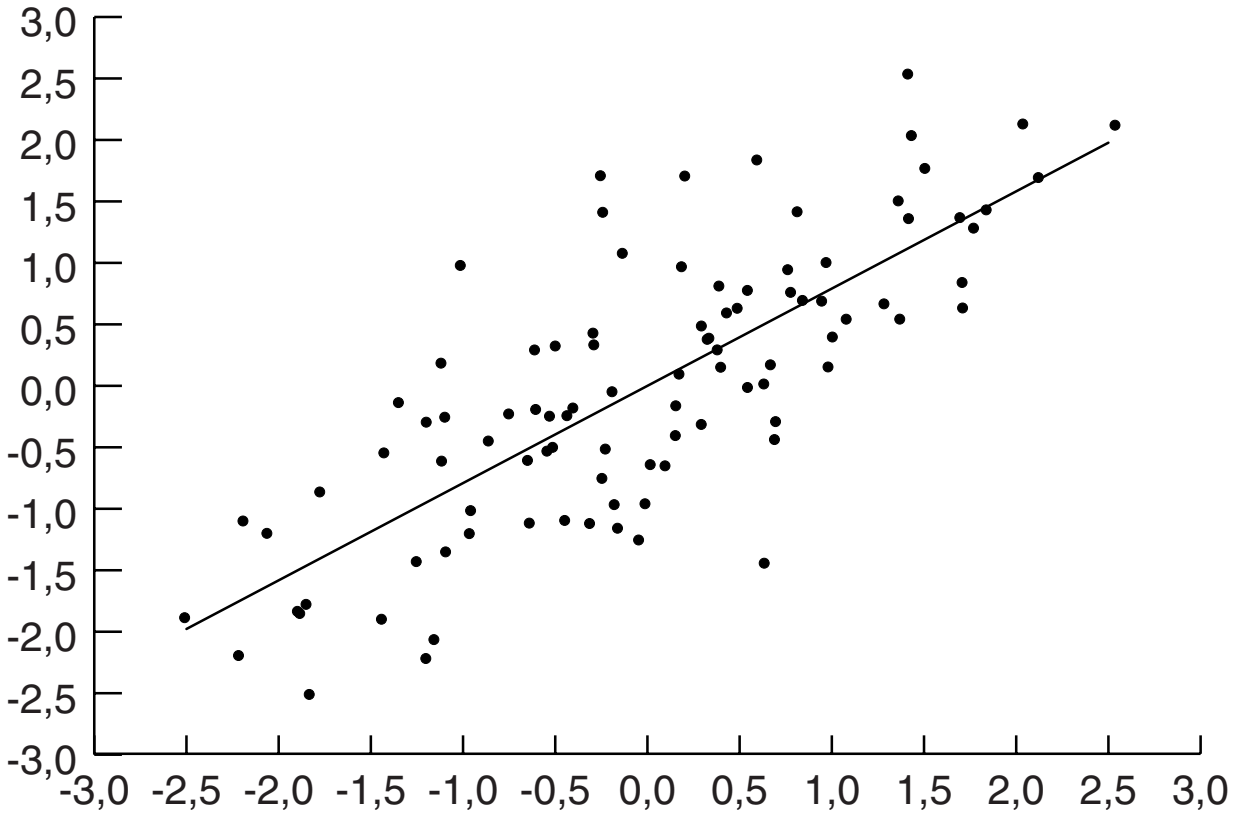
The sample autocorrelation function for the Australian red wine sales showing the bounds $\pm 1.96/\sqrt{n}$

Figure 1.15



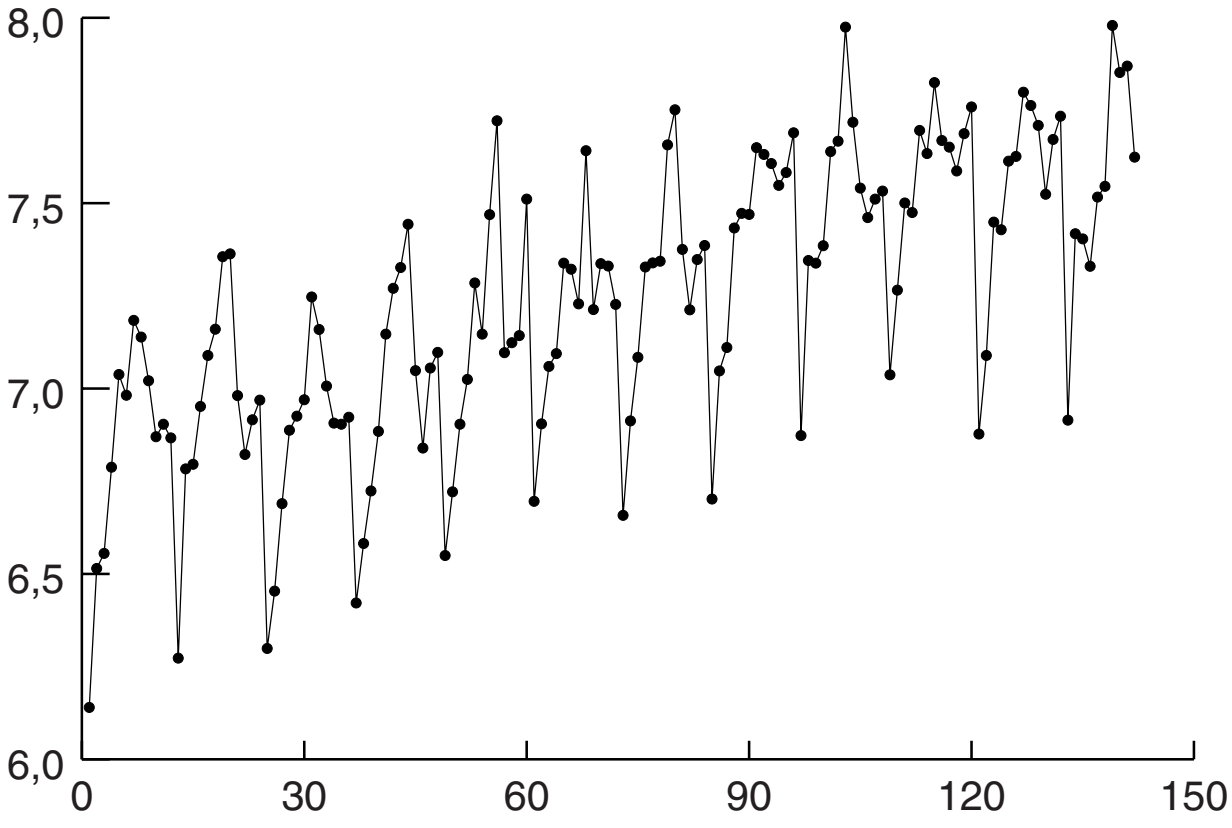
The sample autocorrelation function for the Lake Huron residuals of Figure1.10 showing the bounds $\pm 1.96/\sqrt{n}$

Figure 1.16



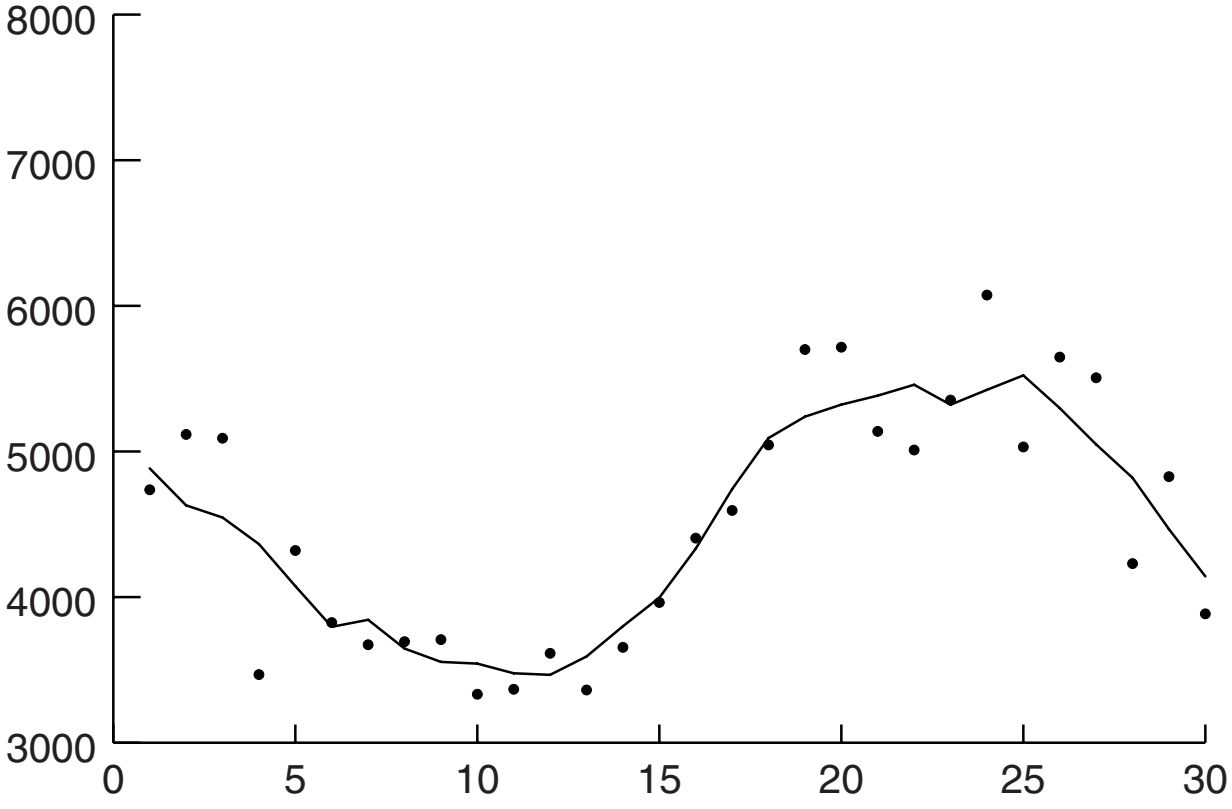
Scatter plot of (Y_{t-1}, Y_t), $t = 2, \ldots, 98$, for the data in Figure 1.10, showing the regression line $y = .791x$

Figure 1.17



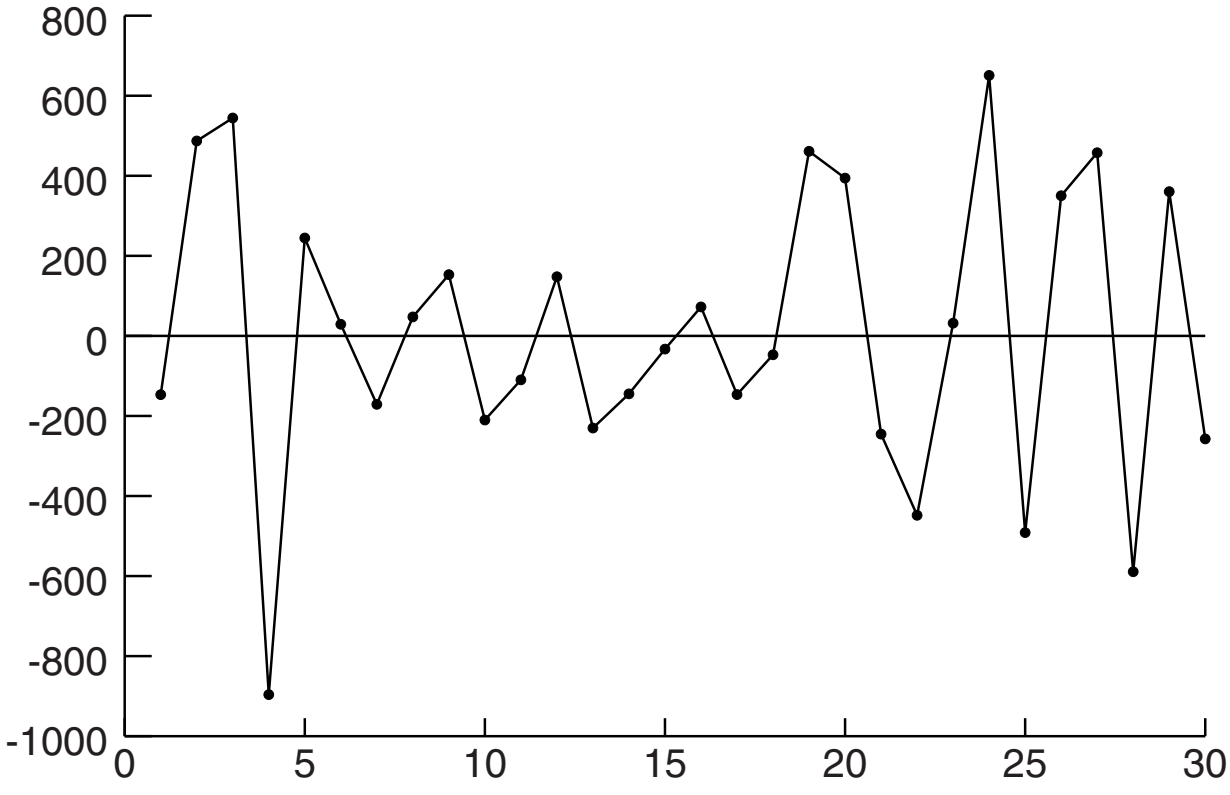
The natural logarithms of the red wine data

Example 1.5.1



Simple 5-term moving-average of the strike data from Figure 1.6

Example 1.5.1

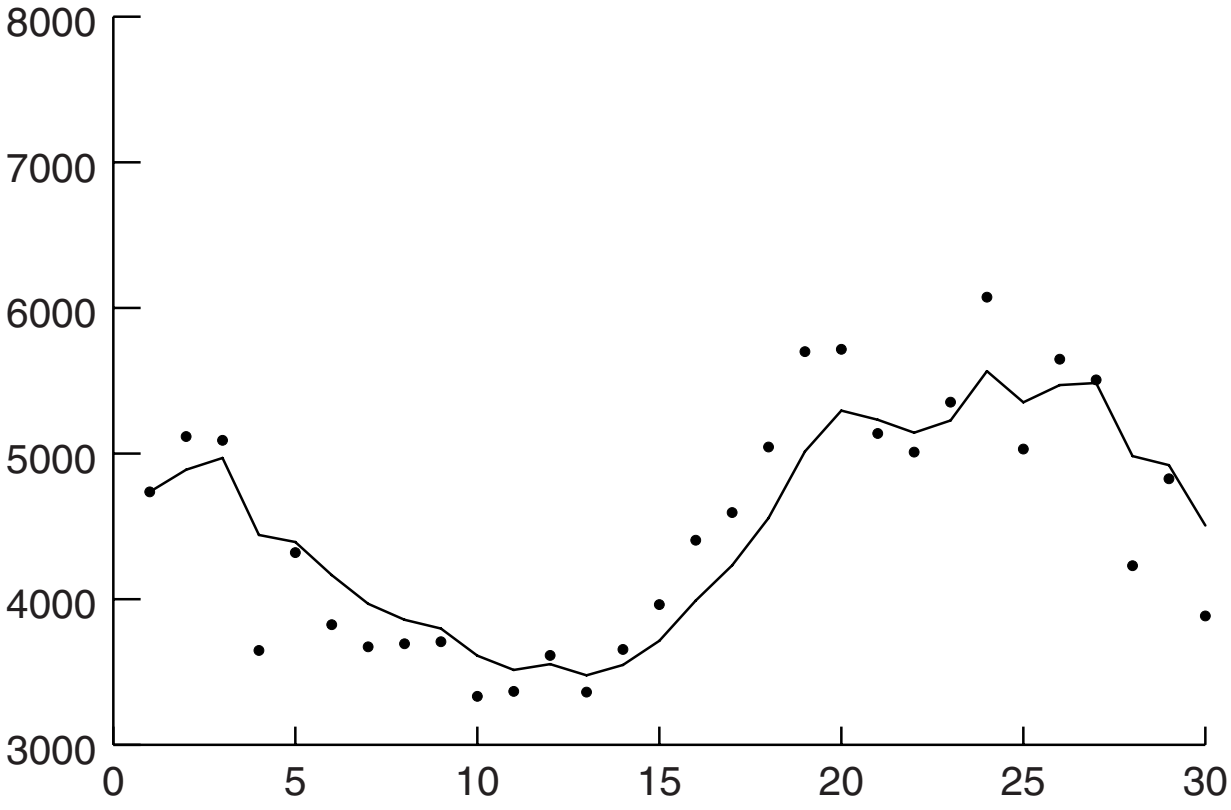


Residuals $\hat{Y}_t = X_t - \hat{m}_t$ after subtracting the 5-term moving-average from the strike data

Figure 1.20

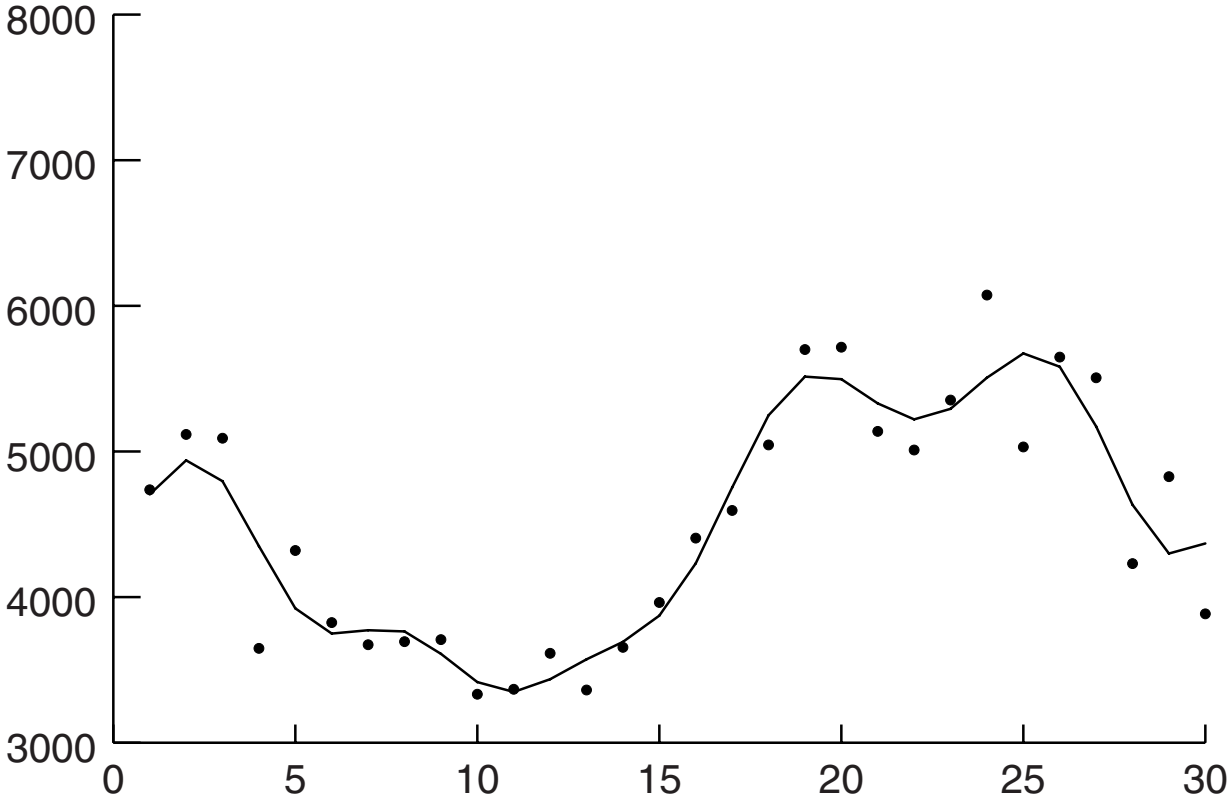
Linear Filter Smoothing with a *low*-pass linear filter

Example 1.5.2



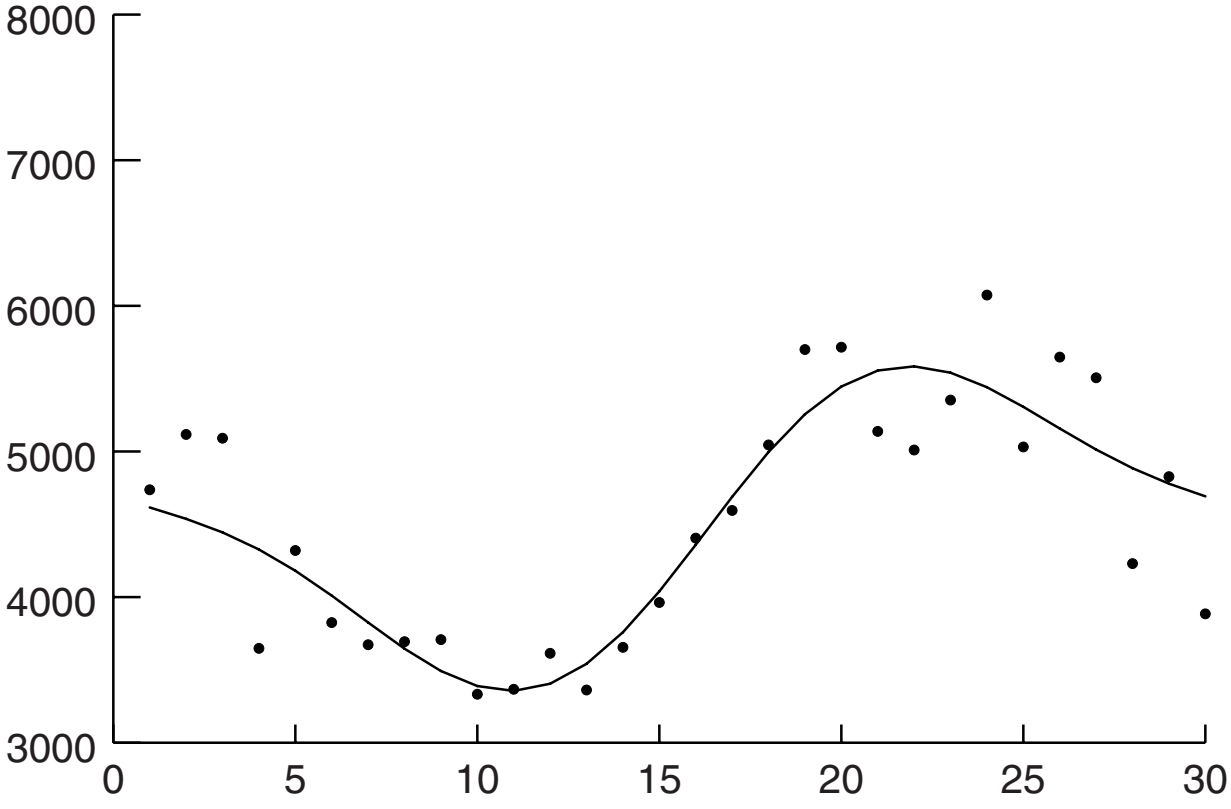
Exponentially smoothed strike data with $a = 0.4$

Example 1.5.2



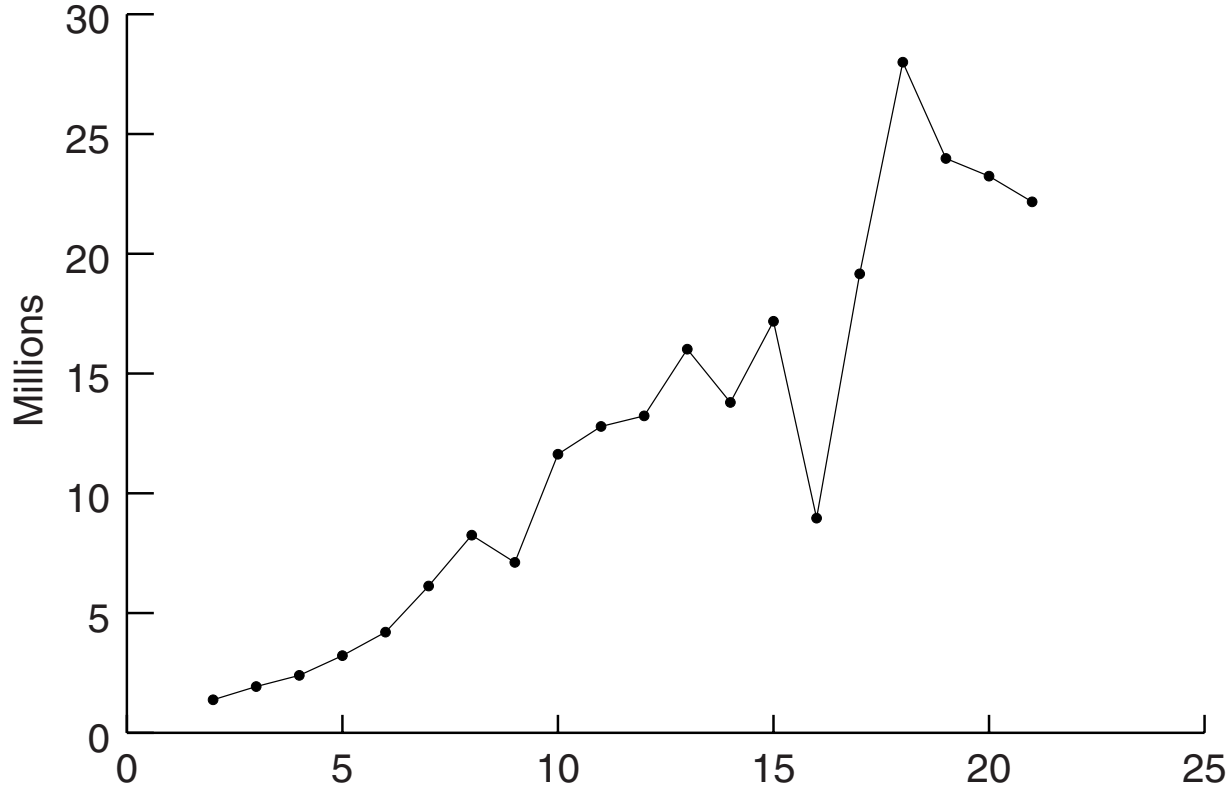
Strike data smoothed by elimination of high frequencies with $f = 0.4$

Example 1.5.2



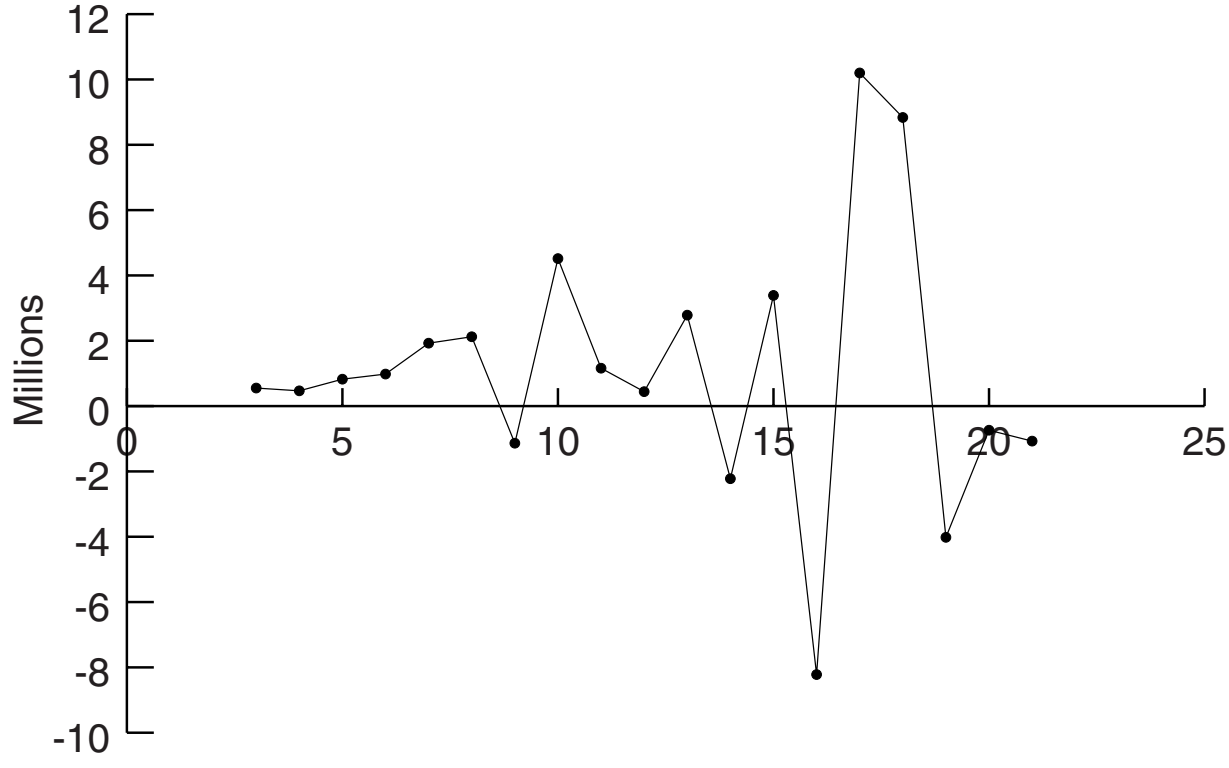
Strike data smoothed by elimination of high frequencies with $f = 0.1\bar{3}$

Example 1.5.3



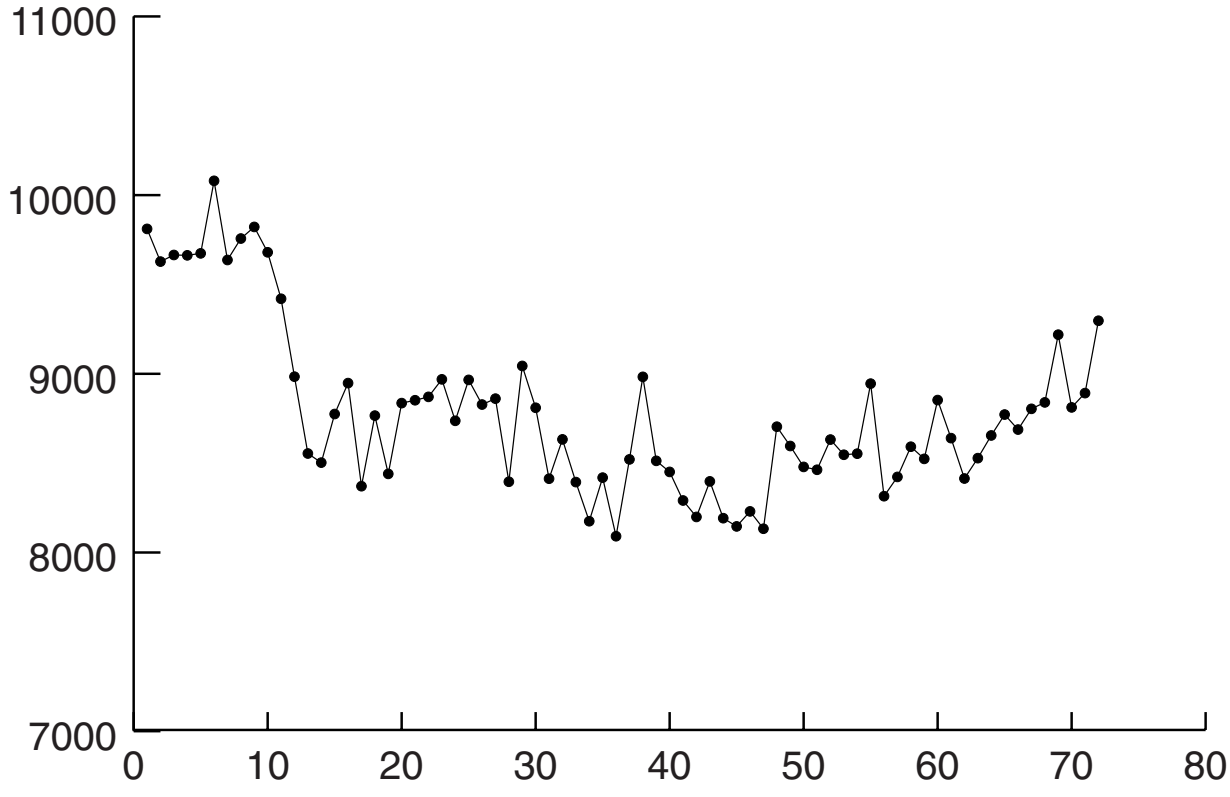
The differenced series derived from the population data of Figure 1.5

Example 1.5.3



The twice-differenced series derived from the population data of Figure 1.5

Example 1.5.4



The deseasonalized accidental deaths data from PEST

Method S1

- Smooth the data:

$$\hat{m}_t = \begin{cases} \frac{1}{d}\left(\frac{1}{2}x_{t-q} + x_{t-q+1} + \cdots + x_{t+q-1} + \frac{1}{2}x_{t+q}\right) \\ \qquad \text{if } q < t \leq n-q \text{ and } d = 2q \\ \frac{1}{d}\left(x_{t-q} + x_{t-q+1} + \cdots + x_{t+q-1} + x_{t+q}\right) \\ \qquad \text{if } q < t \leq n-q \text{ and } d = 2q+1 \end{cases}$$

- Estimate the seasonal component $s_1, s_2, \ldots, s_d$.
- Deseasonalize the series

Method S1; raw data

	Year					
Month	1973	1974	1975	1976	1977	1978
1	9007	7750	8162	7717	7792	7836
2	8106	6981	7306	7461	6957	6892
3	8928	8038	8124	7776	7726	7791
4	9137	8422	7870	7925	8106	8129
5	10017	8714	9387	8634	8890	9115
6	10826	9512	9556	8945	9299	9434
7	11317	10120	10093	10078	10625	10484
8	10744	9823	9620	9179	9302	9827
9	9713	8743	8285	8037	8314	9110
10	9938	9129	9433	8488	8850	9070
11	9161	8710	8160	7874	8265	8633
12	8927	8680	8034	8647	8769	9240

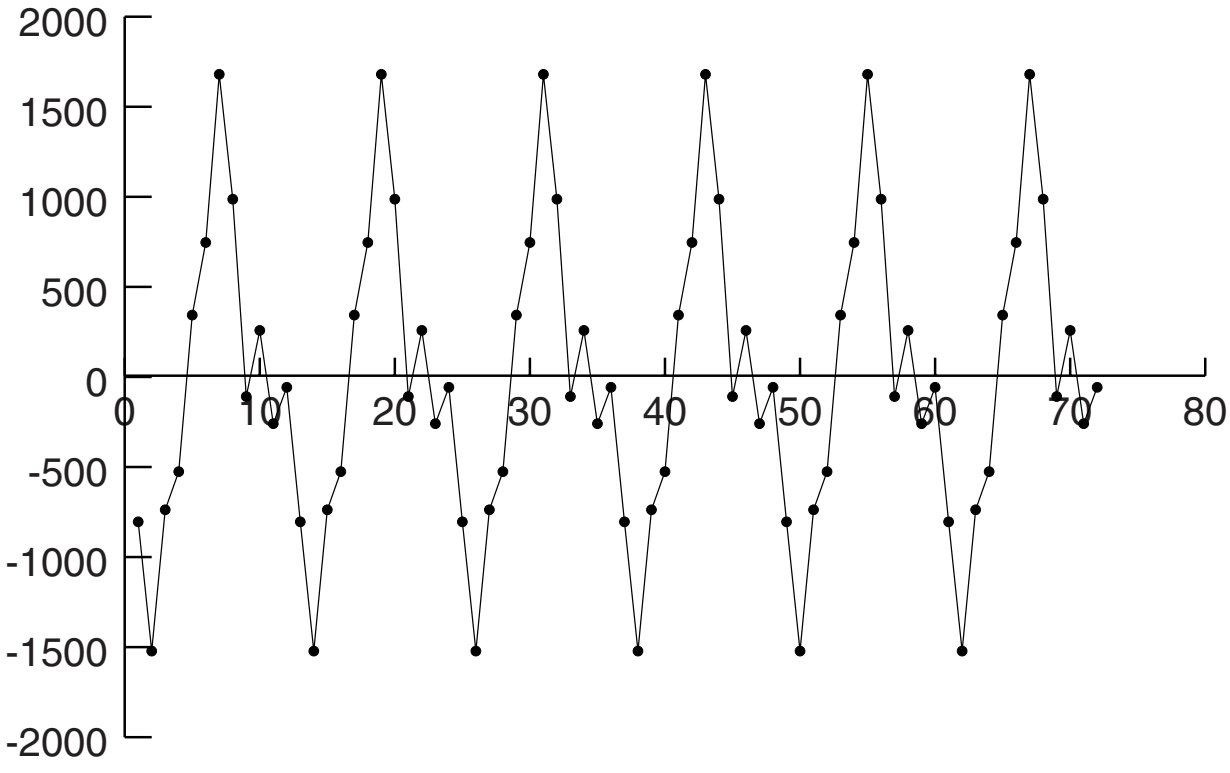
Method S1; smoothed data

	Year					
	1973	1974	1975	1976	1977	1978
1		9051,5	8799,7	8506,3	8445,5	8604,3
2		8963,3	8790,1	8487,3	8473,5	8620,3
3		8884,5	8762,6	8458,6	8490,1	8675,3
4		8810,4	8756,2	8408,9	8516,8	8717,7
5		8757,9	8745,9	8357,6	8548,1	8742,2
6		8728,8	8696,1	8371,2	8569,5	8777,1
7	9599,4	8735,7	8650,6	8399,9	8576,4	
8	9500,1	8766,4	8638,5	8382,0	8575,5	
9	9416,2	8783,5	8630,5	8358,9	8575,5	
10	9349,3	8764,1	8618,3	8364,4	8579,2	
11	9265,2	8769,1	8589,2	8382,6	8589,5	
12	9156,2	8799,0	8532,4	8408,0	8604,5	

Method S1; monthly averages

	Year					
	1973	1974	1977	1978	Average	s_k
1		-1302,0	-653,5	-768,3	-830,1	-820,5
2		-1982,0	-1516,0	-1728,0	-1547,0	-1538,0
3		-846,5	-764,1	-884,3	-763,2	-753,7
4		-388,4	-410,8	-588,7	-551,6	-542,0
5		-43,9	341,9	372,8	317,7	327,2
6		783,2	729,5	656,9	720,7	730,2
7	1717,6	1678,1	2048,6		1654,2	1663,7
8	1243,9	797,0	726,5		961,1	970,6
9	296,8	-321,9	-261,5		-134,5	-125,0
10	588,7	123,6	270,8		432,6	442,1
11	-104,2	-508,6	-324,5		-285,1	-275,6
12	-229,2	239,0	164,5		-88,6	-79,1
				Average :	-9,5	

Example 1.5.4

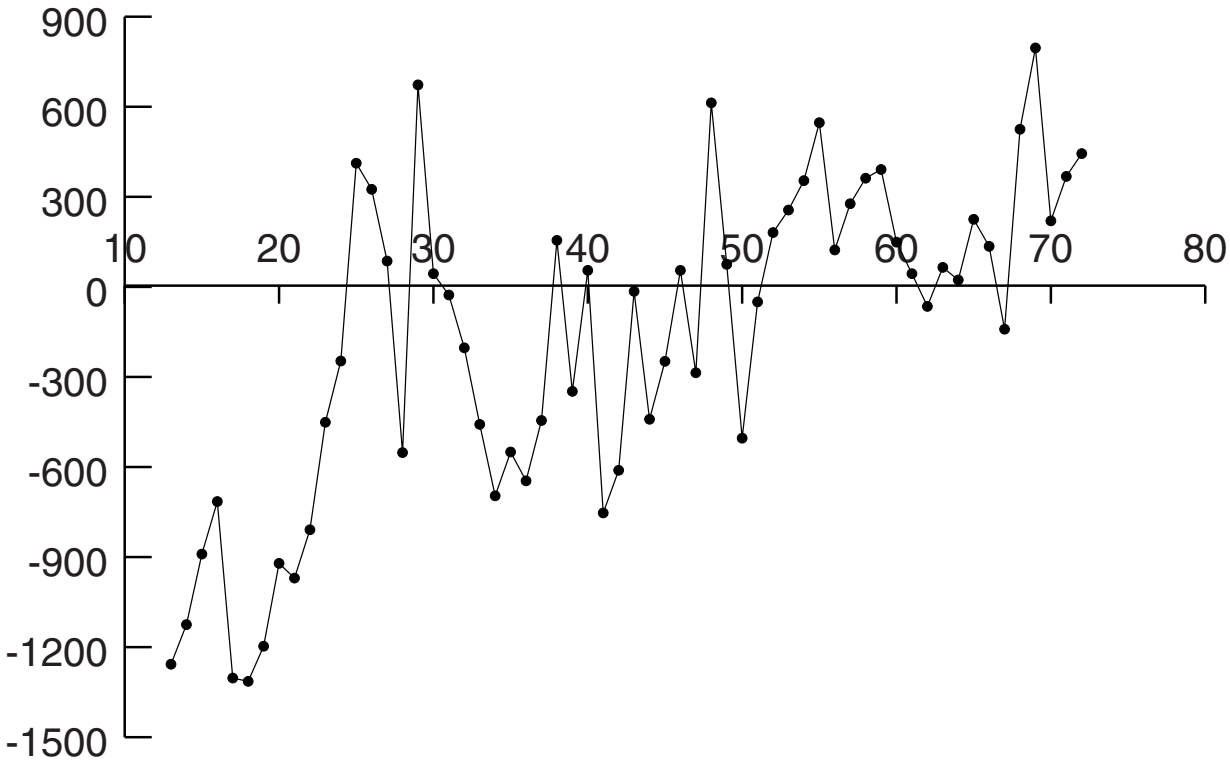


The estimated seasonal component of the accidental deaths

Method S1; Deseasonalized data

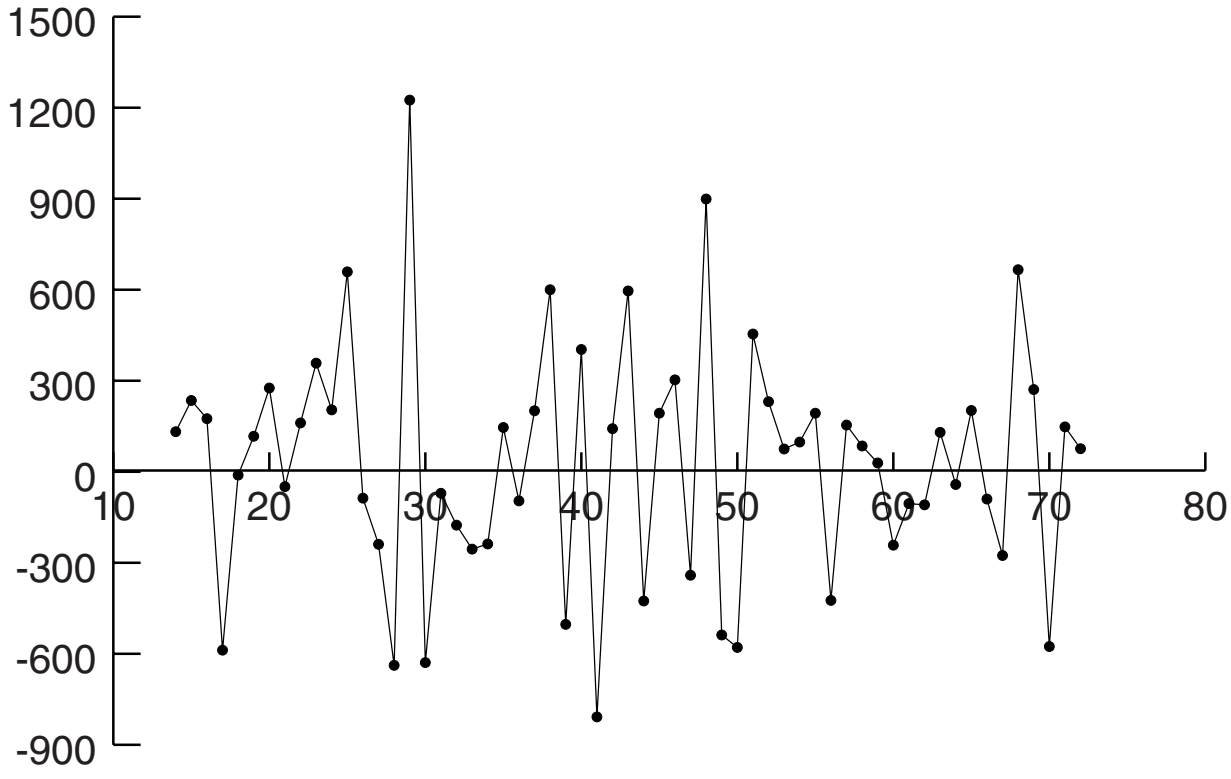
	Year					
	1973	1974	1975	1976	1977	1978
1	9827,5	8570,5	8982,5	8537,5	8612,5	8656,5
2	9644,0	8519,0	8844,0	8999,0	8495,0	8430,0
3	9681,7	8791,7	8877,7	8529,7	8479,7	8544,7
4	9679,0	8964,0	8412,0	8467,0	8648,0	8671,0
5	9689,8	8386,8	9059,8	8306,8	8562,8	8787,8
6	10096,0	8781,8	8825,8	8214,8	8568,8	8703,8
7	9653,3	8456,3	8429,3	8414,3	8961,3	8820,3
8	9773,4	8852,4	8649,4	8208,4	8331,4	8856,4
9	9838,0	8868,0	8410,0	8162,0	8439,0	9235,0
10	9495,9	8686,9	8990,9	8045,9	8407,9	8627,9
11	9436,6	8985,6	8435,6	8149,6	8540,6	8908,6
12	9006,1	8759,1	8113,1	8726,1	8848,1	9319,1

Example 1.5.5



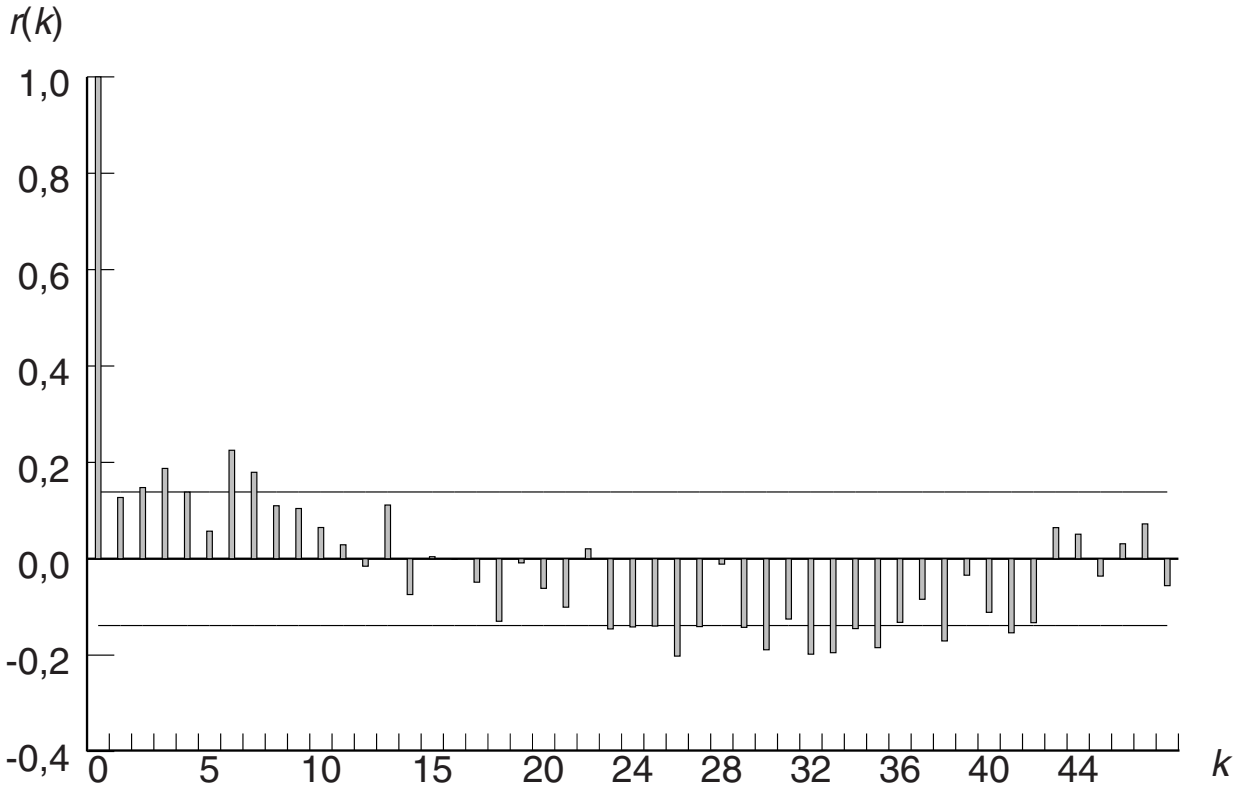
The differenced series $\{\nabla_{12} x_t, t = 13, ..., 72\}$ derived from the monthly accidental deaths $\{x_t, t = 1, \ldots, 72\}$

Example 1.5.5



The differenced series $\{\nabla\nabla_{12}x_t, t = 14, ..., 72\}$ derived from the monthly accidental deaths $\{x_t, t = 1, \ldots, 72\}$

Example 1.6.1



The sample autocorrelation function for the data of Example 1.1.4 showing the hounds $\pm 1.96/\sqrt{n}$