(1)

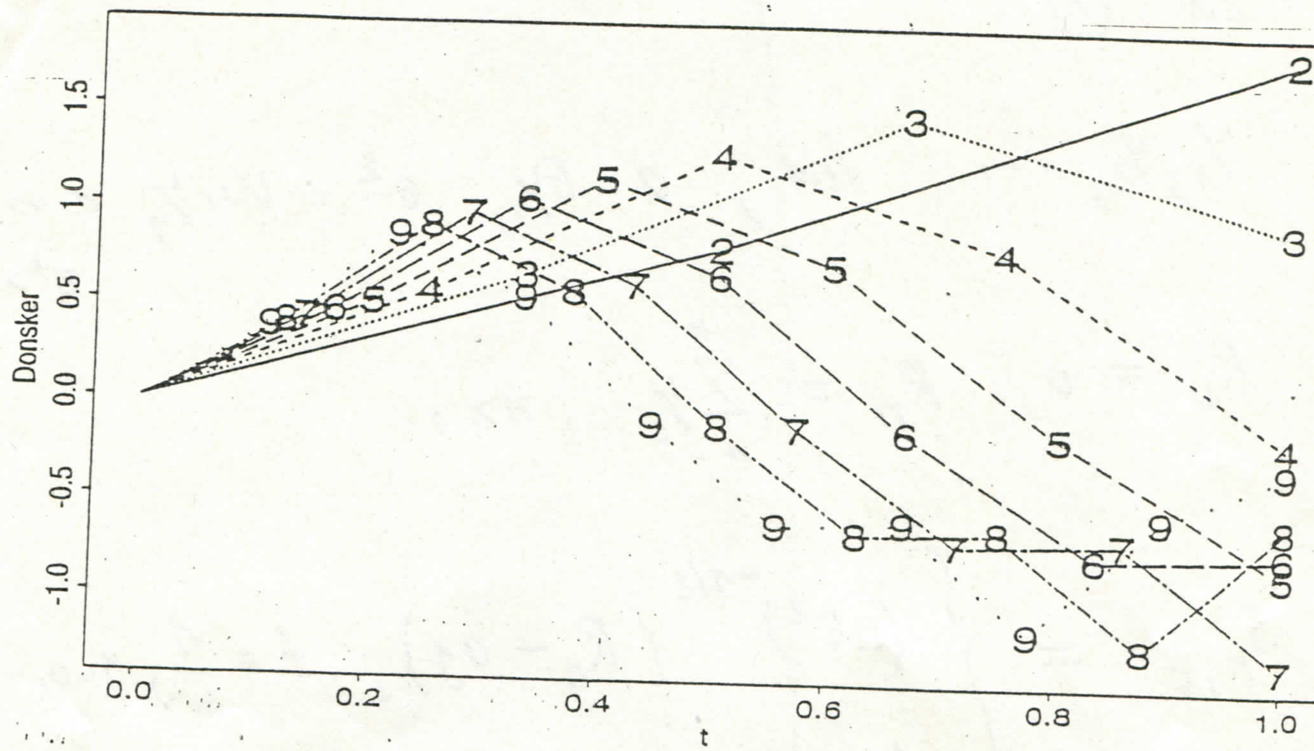

Figure 1.3.11 *Sample paths of the process S_n for one sequence of realizatio* $Y_1(\omega), \ldots, Y_9(\omega)$ *and* $n = 2, \ldots, 9$.

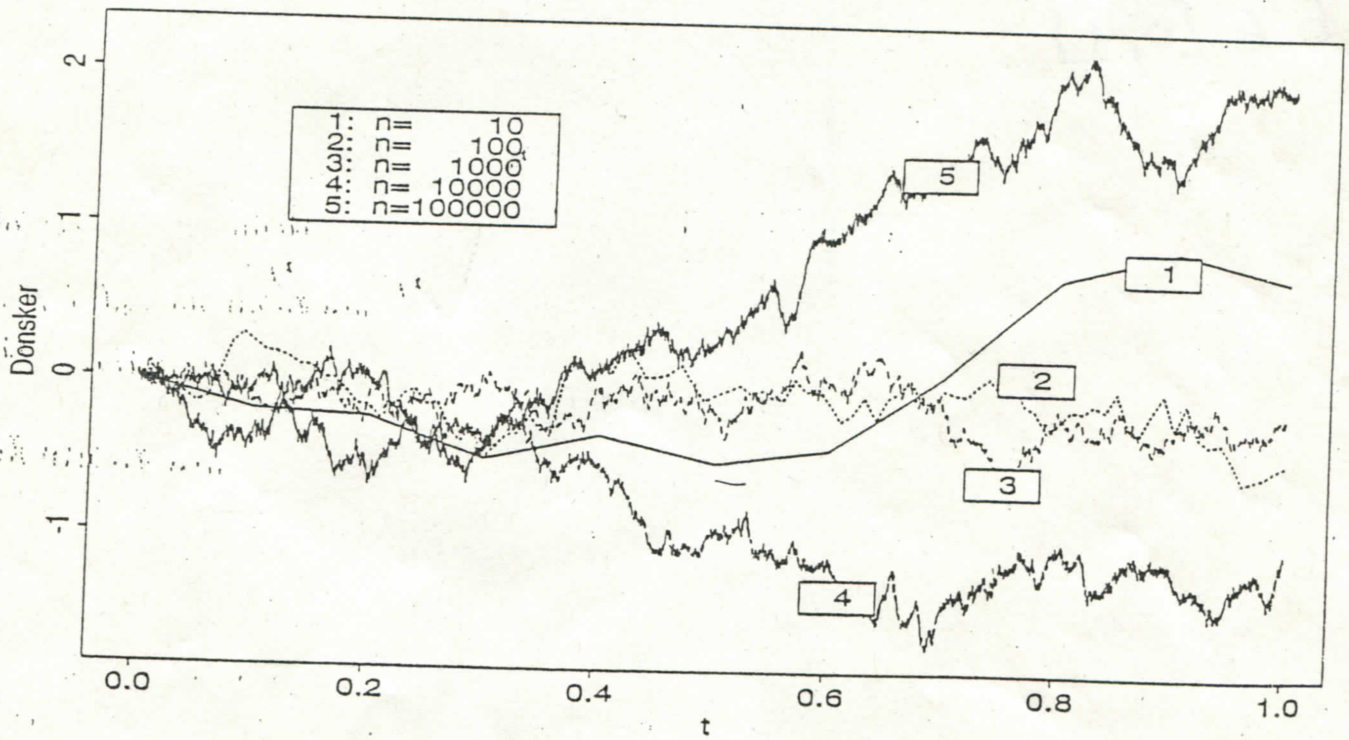

Figure 1.3.12 *Sample paths of the process S_n for different n and the same sequence of realizations* $Y_1(\omega), \ldots, Y_{100,000}(\omega)$.

zu (1)

$Y_1, Y_2, \ldots$ iid, $a = EY_1$, $\sigma^2 = \operatorname{Var} Y_1 < \infty$, $\sigma^2 > 0$

$R_0 = 0$, $R_n = \sum_1^n Y_i$, $n \geq 1$

$$S_{n,t} = \begin{cases} (n\sigma^2)^{-1/2}(R_j - aj), & t = \frac{j}{n}, j = 0, \ldots, \\ \text{linear interpoliert}, & \text{sonst} \end{cases}$$

$t \in [0,1]$

2

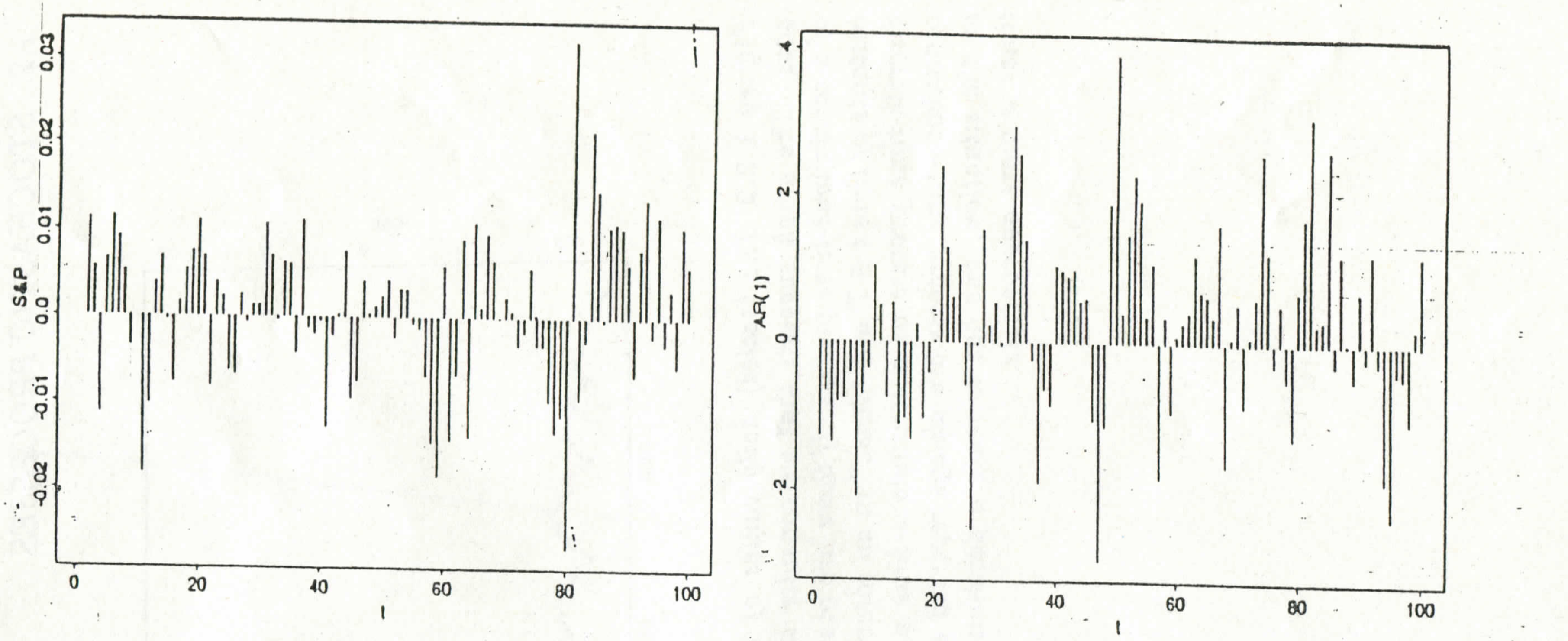

Figure 1.2.4 *Two time series* X_t, $t = 1, \ldots, 100$. Left: 100 *successive daily log-returns of the S&P index; see Figure 1.1.4.* Right: *a simulated sample path of the autoregressive process* $X_t = 0.5X_{t-1} + Z_t$, *where* Z_t *are iid* $N(0,1)$ *random variables; see Example 1.2.3.*

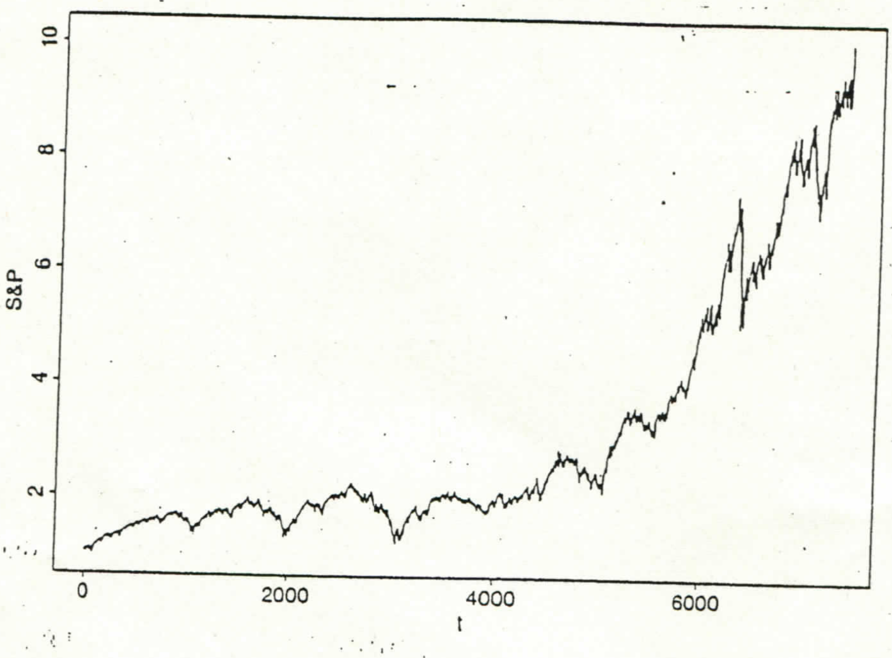

Figure 1.2.2 *The (scaled) daily values of the S&P index over a period of 7,422 days. The graph suggests that we consider the S&P time series as the sample path of a continuous-time process. If there are many values in a time series such that the instants of time $t \in T$ are "dense" in an interval, then one may want to interpret this discrete-time process as a continuous-time process. The sample paths of a real-life continuous-time process are always reported at discrete instants of time. Depending on the situation, one has to make a decision which model (discrete- or continuous-time) is more appropriate.*