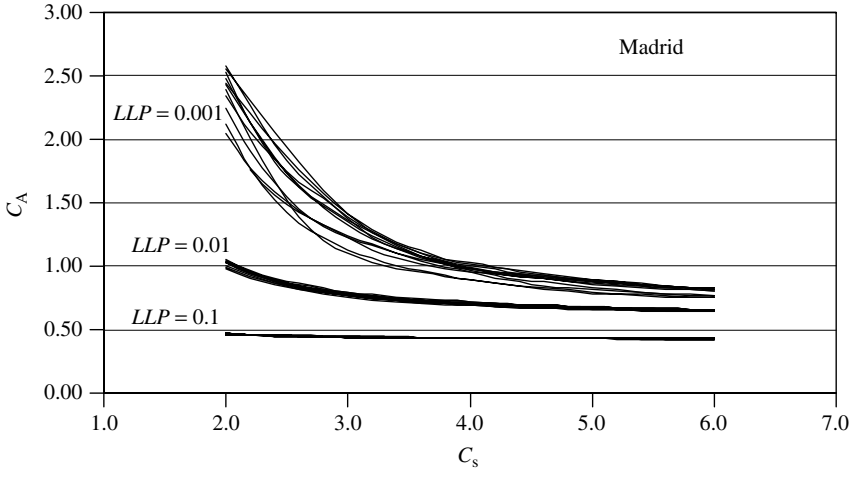

Figure 20.24 Simulated reliability maps, C_A versus C_S, with the historical and with 12 generated solar radiation sequences for three different reliability *LLP* values

algorithms etc.); but it is of little value when considering the pure size problem, for which a judicious and rather simple hypothesis suffices. A similar conclusion is presented in Kaiser and Sauer [79], from a comparison of the long-term energy yield of stand-alone PV systems simulated with both simple and detailed models. The authors observe that the range of uncertainty due to possible fluctuations of the radiation-time series is significantly larger than the those corresponding to changes in the PV-system component modelling, and conclude "*The results make it clear that exact simulation models can provide exact numbers, but do not automatically allow exact predictions*".

This can also help explain why PV-system sizing simply based on guesswork remains widely practiced in current engineering practices. This prevents any quantitative relationships between C_A, C_S and *LLP* being established. The size of the generator is instead chosen to ensure that the energy produced during the design period (most often, the worst month) exceeds the demand of the load by a margin that depends on the designer's experience. A similar procedure is used to size the accumulator. In summary,

$$C_A = F_{S1} \text{ and } C_S = F_{S2} \tag{20.86}$$

where F_{S1} and F_{S2} are arbitrary factors. For example, $C_A = 1.1$ and $3 \leq C_S \leq 5$ are common values for rural electrification purposes [80]. $1.2 \leq C_A \leq 1.3$ and $5 \leq C_S \leq 8$ are common ranges on the so-called professional market [71]: telecommunication and so on.

It is worth pointing out that this rather unscientific way of proceeding does not necessarily give bad results, in terms of reliability and cost. As a matter of fact, a proper combination of expertise and common sense often leads to very good results. Today, PV systems have the reputation of being reliable, even in those sectors where high reliability is an established requirement, such as telecommunications and cathodic protection. This helps explain why reliability quantification is generally considered irrelevant in real