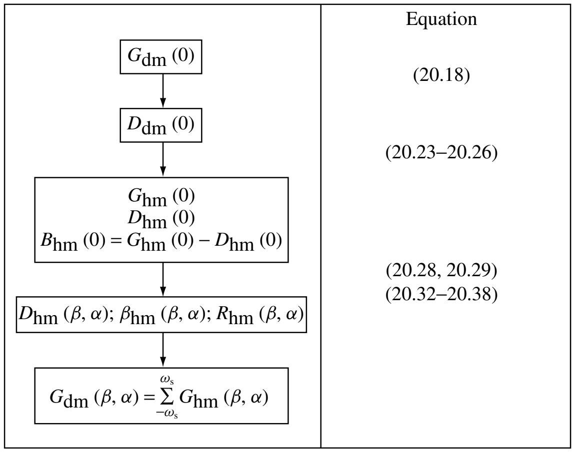

Figure 20.16 Diagram explaining the calculation of the daily irradiation on an inclined surface $G_{dm}(\beta, \alpha)$ from the corresponding horizontal value $G_{dm}(0)$

$$D_{dm}(50) = 633 \text{ Wh/m}^2; B_{dm}(50) = 2990 \text{ Wh/m}^2; R_{dm}(50) = 66 \text{ Wh/m}^2$$

$$G_{dm}(50) = 3689 \text{ Wh/m}^2$$

It is worth mentioning that a more detailed calculation, following the procedure outlined in Figure 20.16, would lead to $G_{dm}(50) = 3956$ Wh/m^2. That means the error associated to equation (20.40) is below 8%. This difference is mainly due to the different consideration of the diffuse radiance distribution.

20.6 DIURNAL VARIATIONS OF THE AMBIENT TEMPERATURE

The behaviour of the photovoltaic modules depends, to some extent, on the ambient temperature. Just as it is for solar radiation, sometimes it is necessary to determine how this parameter varies throughout the day. The data available as a starting point for this calculation are, in general, the maximum and minimum temperature of the day, T_{aM} and T_{am}, respectively.

A model that is simple but, nevertheless, gives a good fit to the experimental values is obtained from the fact that the temperature evolves in a similar manner to the global radiation but with a delay of about 2 h. This fact allows the following three principles to be deduced

- T_{am} occurs at sunrise ($\omega = \omega_S$).
- T_{aM} occurs two hours after midday ($\omega = 30°$).
- Between these two times, the ambient temperature develops according to two semi cycles of a cosine function: one from dawn to midday, and the other between midday and sunrise of the following day.