1.21. Calculation of the wind triangle according to Mailloux

1.21.1. General

Fig.1.21/1 shows the „Cercle Calculateur“ invented by Louis-Joseph Mailloux. The computer has 360 cuts around the perimeter through which threads can be fastened. In this way, points or lines can be defined without the need to make any entries.

1.21.2. Use of the computer for drift-, wind correction- and ground speed calculations

Fig. 1.21/1 illustrates the handling of the device when calculating the wind triangles using the following example:

true airspeed	120 kt
true heading/course	360°
true wind direction	050° (wind angle 50°)
wind speed	40 kt (0.33 TAS)
wind correction angle	+14.79°
ground speed 1	90.31 kt
drift angle	- 18.0°
ground speed 2	99.1 kt

1. To mark the direction of the wind vector, first thread (1 - 1) is fastened between the points 050° and 230° of the outer scale. On this line the wind point W is on the position 0.33 TAS.
2. A second thread (2 - 2) is fastened between the zero point of the outer scale and the wind point W. This thread ends in the lower outer scale at the drift angle - 18°.
3. The dashed green line along the green (concentric) arcs through the wind point ends on the speed scale at 0.83, so that in the drift triangle the ground speed is 0.83 ×120 kt = 99.6 kt.
4. The dashed red line along the red (parallel) arcs through the wind point ends at 0.74 on the speed scale, so that in the wind correction triangle a ground speed of 0.74 × 120 kt = 90 kt results.
5. From the wind point along the vertical lines upwards one finds the wind correction angle of 15°.

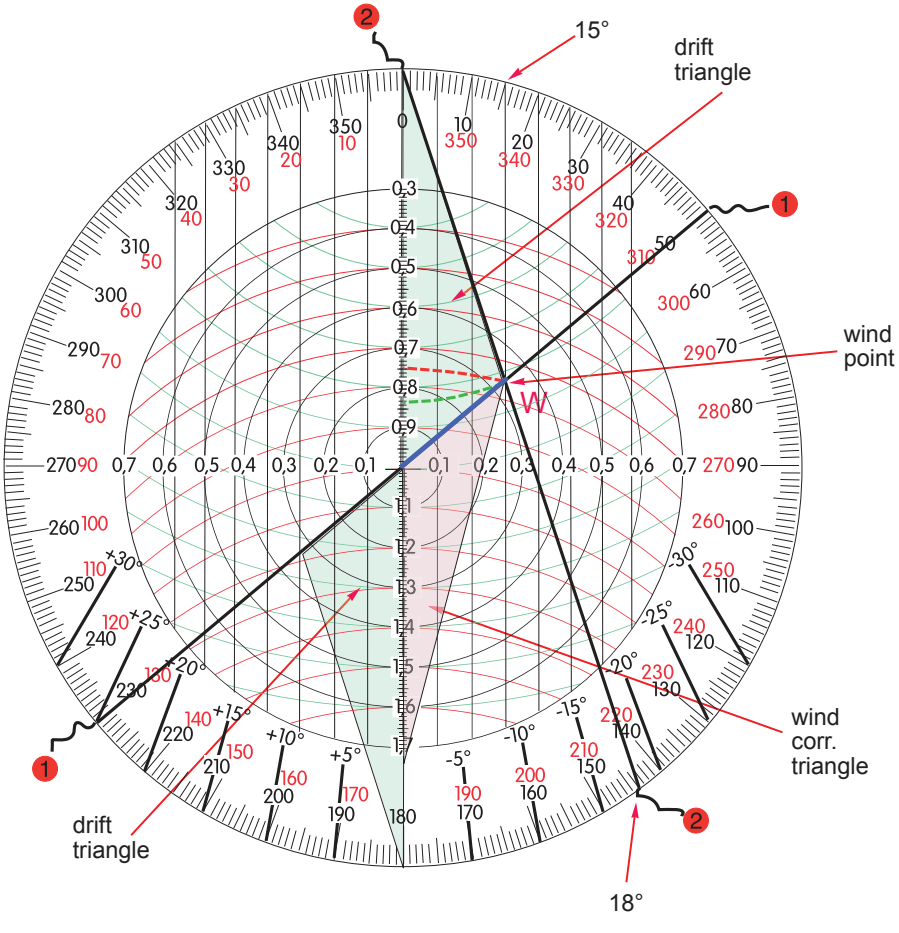

Fig.1.21/1

1.21.3. Use of the computer for wind determination from drift and ground speed

Fig.1.21/1 is also used for the description of the wind calculation from a drift angle (-18°) and a ground speed (99 kt). First a thread is fastened between the zero point of the outer scale and the point DA = 18° on the drift scale, on which the wind point must lie at the position GS : TAS = 99 : 120 = 0.83. Consequently, the wind point is found at the intersection of the green speed circle 0.83 with the drift line. For the determination of the wind direction a second thread is fastened through the wind point and the center, which cuts the outer scale at the wind direction 050°. The wind point lies on a circle of the radius 0.33, so that a wind speed of 0.33 × 120 kt = 40 kt results.

1.21.4. Use of the computer for wind determination from two drift angles

Fig. 1.21/2 illustrates the handling of the device when calculating the wind from two drifts using the following example:

true heading 1	360°
true heading 2	090°
drift angle 1	+14°
drift angle 2	+10°
true airspeed	100 kt
true wind direction	295.0°
wind speed	24.5 kt

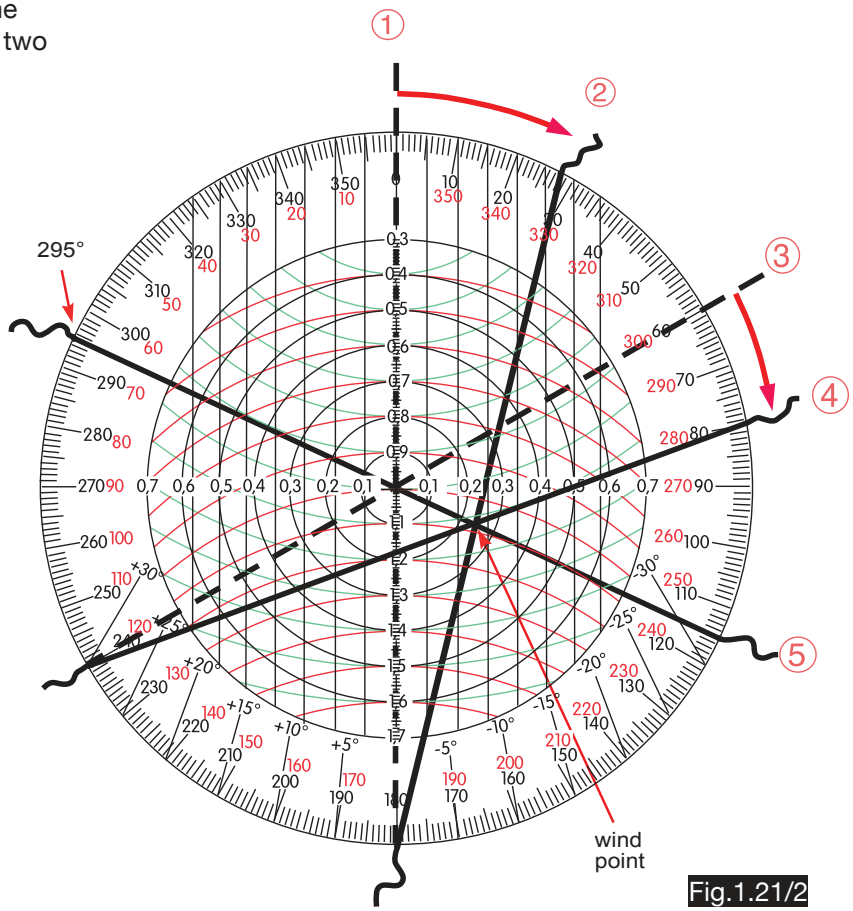

Fig.1.21/2

Solution:

First a thread is fastened which corresponds to the 1st course of 360° (dashed line 1), but it is fixed in the notch 28° (2×14). Because of the double radius, this corresponds in good approximation to a rotation around the 1st drift angle (14°). Line 2 represents the first track. In the same way, a thread is fastened in the direction of the second course (060°) (dashed line 3). After rotation by 20°(doubled second drift angle of 10°), this represents track 2. It must therefore be fixed at 80° (60° + 2×10°). At the intersection of the threads 2 and 4 one will find the wind point.
A third thread (5) is fastened so that it lies above the wind vector running from the centre to the wind point. The wind direction thus results in 295°. The wind speed is determined by concentric circles. Since the wind point lies between the circles 0.2 and 0.3 (about 0.25), the wind speed is about 25 kt (0.25 × 100 kt).