A Totally Real Folding of the Regular Heptagon

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There are several origami constructions for the heptagon; see [**4**] for one example. However, the construction is a totally real construction [**3**], so we can achieve it with bisections and trisections of angles and constructions of perpendicular through a point not on a line. We modify the heptagon construction in [**2**]. The explantion of the trisection which we use below is discussed there.

Take a square piece of paper say 6 units on a side with center V and OV of length 1 on the horizontal midline OVA_7 of the square.

Construct distance of $BV = 3\sqrt{3}$ on the vertical midline of the square. First construct A with AV of length 5 parallel to the vertical mideline; bisect the angle of AV and midline; reflect A across this bisector to A' on the midline; $A'V$ has length $\sqrt{26}$; move A' to A_1 and reflect back to B so that the hypotenuse BO of $\triangle BOV$ has length $\sqrt{28}$.

Trisect $\angle BOV$ to get the point T as in Abe's trisection (OT is the trisection with the base OB).

Reflect B to B_2 across OT. Reflect B_2 across OV to get B_3.

We fold the heptagon as follows.

(1) Fold A_7 across VB_3 to get G_7.
(2) Reflect G_7 across OA_7 to get B_7.
(3) Construct 180 degree symmetry of G_7 about V to G_7'
(4) Bisect $\angle G_7'VB_3$, reflect G_7' across this bisector to D_7
(5) Reflect D_7 across VO to get vertex E_7.
(6) Reflect E_7 across the bisector of $G_7'VB_3$ (through B_7) to get F_7
(7) Reflect F_7 across VO to get C_7.

References

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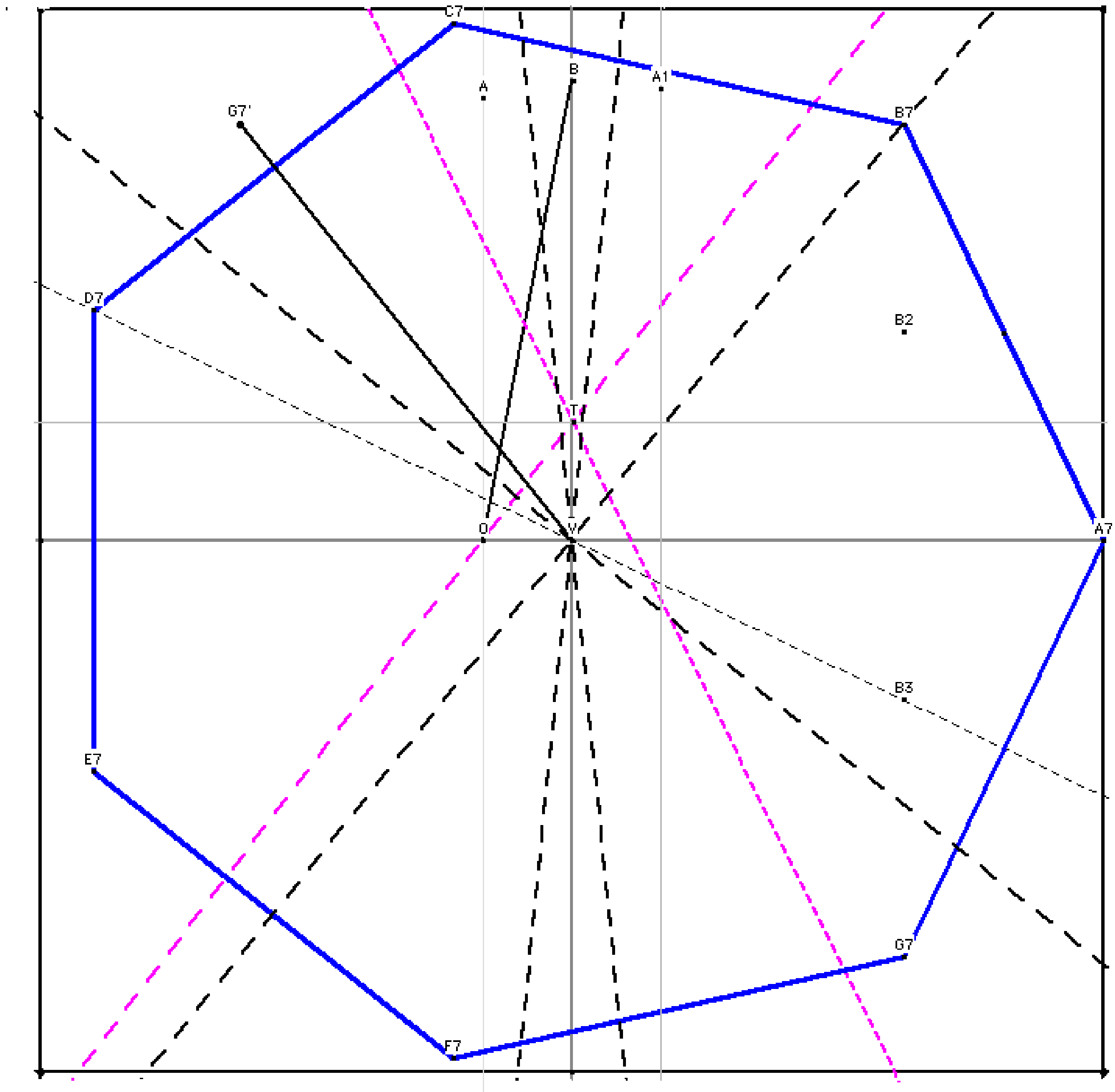

FIGURE 1. Folding the Regular Heptagon

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