A Procedure to (Approximately) Trisect an Arbitrary Angle

MAHESH BUBNA

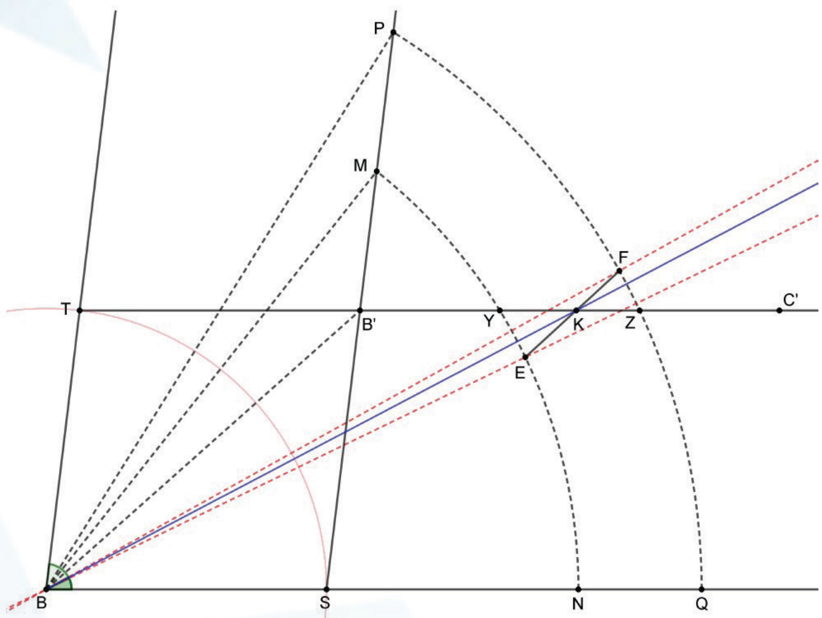

Figure 1

1. Given: an angle to be trisected. Let its vertex be B. Draw an arc with centre B cutting the arms of the angle at T and S. Locate B' such that $TBSB'$ is a parallelogram; see Figure 1. ($TBSB'$ will be a rhombus.)
2. Extend the segments TB', SB' and BS. (That is, draw the rays TB', SB' and BS.)
3. On the extension of TB', locate point C' such that $B'C' = BB'$. Then locate Y and Z, the points of trisection of $B'C'$ (so $B'Y = YZ = ZC' = B'C'/3$).

Keywords: Angle trisection, approximate

(4) With centre *B*, draw an arc through *Y*; let it meet ray *SB'* at *M* and ray *BS* at *N*.

(5) With centre *B*, draw an arc through *Z*; let it meet ray *SB'* at *P* and ray *BS* at *Q*.

(6) Draw the angle bisector of ∡*NBM*. Let it meet arc *MN* at *E*.

(7) Draw the angle bisector of ∡*QBP*. Let it meet arc *PQ* at *F*.

(8) Locate *K*, the point of intersection of *EF* and *B'C'*.

(9) Then *BK* is the proposed trisector of ∡*TBS*. We claim that ∡*KBS* is almost exactly equal to ⅓ of ∡*TBS*.

Note by the editor

We give a complete analysis of the procedure in an accompanying article, elsewhere in this issue.

An animation of the procedure in movie form has been uploaded to the following location: https://www.dropbox.com/s/c6ux9r787wdpotf/Trisect%20an%20angle.mp4?dl=0 Do have a look at it!

MAHESH BUBNA is a retired bank officer (retired after a lifetime of service in the Bank of Baroda), now settled in Mumbai. He has been keenly interested in mathematics, particularly geometry, from his early school days. He writes that he has been entangled with the problem of angle trisection for the last four decades. He may be contacted at mbubna24@gmail.com.