Why Quivering Polygon Peaks Rotate the way they Do (a triangular example)
This explainer brings together images from the Subdivision numbered and Tracking Lines Excel files to examine why these peaks rotate clockwise. We have $\cup$ rotation since $\boldsymbol{n}=\boldsymbol{P}=29<30$ but change 29 to 31 and $\cup$ rotation occurs.


In this instance, it is useful to think of the early Sub Ends (which notes the number of subdivisions from the start of the VF frame segment) as the distance from the end of the VF segment. In this conceptualization (mathematically Sub End $-S$ ), the first line ends at $-1\left(1 / 30^{\text {th }}\right.$ of the way from vertex 10 to 0 , the second ends at $-2\left(2 / 30^{\text {th }}\right.$ of the way from vertex 20 to 10$)$, and $3^{\text {rd }}$ at -3 . This means that the first peak at subdivision point $87=3 \cdot 29$, $\boldsymbol{k}=3$ to left and below and highlighted in yellow above) is at Level 3, to the right of the centerline of the image $3 / 30=1 / 10^{\text {th }}$ of the way from vertex 1 to 20. The second triangular peak, also highlighted above at subdivision point $174=6 \cdot 29$, $\boldsymbol{k}=6$ is at Level 6 . The $3^{\text {rd }}$ is at Level 9 , the $4^{\text {th }}$ at Level 12 . The $5^{\text {th }}$ is (the innermost) Level 15 , on the centerline, halfway along the horizontal VF line from 24 and 5). The $6^{\text {th }}$ peak, at $\boldsymbol{k}=18$, is at Level 12 , and $7^{\text {th }}-9^{\text {th }}, \boldsymbol{k}=21,24$, and 27 are at Levels 9,6 , and 3 , respectively. Note that $783=27 \cdot 29$ is $3 / 30=1 / 10^{\text {th }}$ of the way from vertex 28 to 9 , to the left of the centerline. The final line ( $k=30$ ) completes the $10^{\text {th }}$ peak at the top of the image. The peaks were completed in a clockwise rotation.

| Line $\boldsymbol{k}$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Sub End | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Segment | 0.97 | 1.933 | 2.9 | 3.867 | 4.833 | 5.8 | 6.767 | 7.733 | 8.7 | 9.667 | 10.63 | 11.6 | 12.57 | 13.53 | 14.5 | 15.5 | 16.4 | 17.4 | 18.4 | 19.3 | 20.3 | 21.3 | 22.2 | 23.2 | 24.2 | 25.1 | 26.1 | 27.1 | 28.0 | 29.0 |
| VF Start | 0 | 10 | 20 | 1 | 11 | 21 | 2 | 12 | 22 | 3 | 13 | 23 | 4 | 14 | 24 | 5 | 15 | 25 | 6 | 16 | 26 | 7 | 17 | 27 | 8 | 18 | 28 | 9 | 19 | 0 |
| VF Stop | 10 | 20 | 1 | 11 | 21 | 2 | 12 | 22 | 3 | 13 | 23 | 4 | 14 | 24 | 5 | 15 | 25 | 6 | 16 | 26 | 7 | 17 | 27 | 8 | 18 | 28 | 9 | 19 | 0 | 10 |
| The Vertex Frame (VF) start and stop values are the RED numbered vertices of the polygon. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Level | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| $\Delta$ Level | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

