Lenses

https://github.com/heptagons/lenses

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Abstract

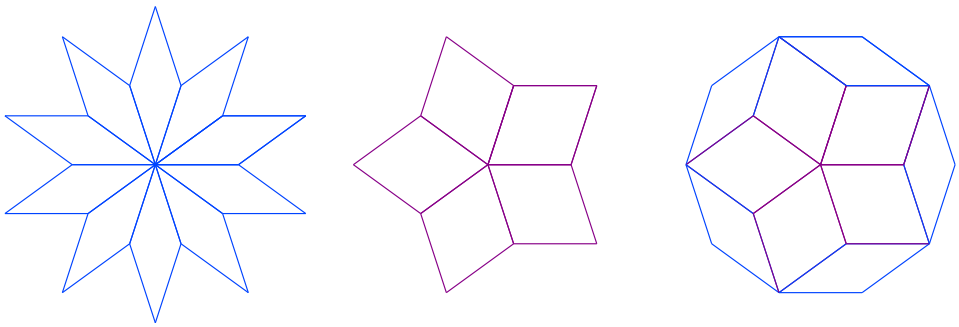
Lenses are equilateral hexagons resembling concave and convex optical lenses. The hexagons consecutive six internal angles are $(\theta_1, \theta_2, \theta_3, \theta_1, \theta_2, \theta_3)$ where $\theta_1 = X\theta_0$, $\theta_2 = Y\theta_0$, and $\theta_3 = Z\theta_0$ where $\theta_0 = 2\pi/S$ is the base angle of symmetry S.

1 Lenses

2 Symmetry 5

Symmetry 5 uses as base the angle $\beta = \dfrac{2\pi}{5}$. Includes two rhombi $\boldsymbol{b}$ and $\boldsymbol{c}$ and two lenses $\boldsymbol{B}$ and $\boldsymbol{C}$.

2.1 Rhombi $\boldsymbol{b}$ and $\boldsymbol{c}$



(i) (ii) (iii)

Figure 1: Rhombi of the types $\boldsymbol{b}$ and $\boldsymbol{c}$.

Figure 1 show rhombi $\boldsymbol{b}$ and $\boldsymbol{c}$. $\boldsymbol{b}$ is the rhombus with smallest internal angles equal to $\dfrac{\beta}{2} = \dfrac{\pi}{5}$. $\boldsymbol{c}$ is the rhombus with smallest internal angles equal to $\beta = \dfrac{2\pi}{5}$. Figure (i) show a dissected star whose area equals to $10\boldsymbol{b}$. Figure (ii) show a dissected star whose area equals to $5\boldsymbol{c}$. Figure (iii) show a dissected regular decagon whose area equals to $5\boldsymbol{b} + 5\boldsymbol{c}$.

2.2 Lenses $\boldsymbol{B}$ and $\boldsymbol{C}$

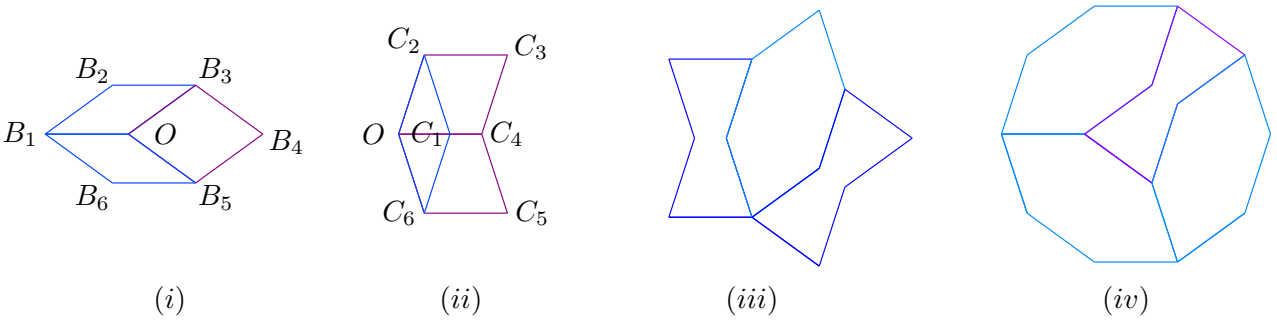


Figure 2: Lenses of types $\boldsymbol{B}$ and $\boldsymbol{C}$.

Figure 2 show lenses $\boldsymbol{B}$ and $\boldsymbol{C}$. Figure (i) show the lense $\boldsymbol{B}$ with perimeter $\overline{B_1...B_6}$ which is formed adding two rhombi $\boldsymbol{b}$ and adding one rhombus $\boldsymbol{c}$ so its area equals to $2\boldsymbol{b}+\boldsymbol{c}$. Figure (ii) show the lense $\boldsymbol{C}$ with perimeter $\overline{C_1...C_6}$ which is formed adding two rhombi $\boldsymbol{c}$ and substracting one rhombus $\boldsymbol{b}$ so its area equals to $2\boldsymbol{c}-\boldsymbol{b}$. Figure (iii) show a dissected star whose area equals to $2\boldsymbol{C}+\boldsymbol{B}=5\boldsymbol{c}$. Figure (iv) show a dissected regular decagon whose area equals to $3\boldsymbol{B}+\boldsymbol{C}=5\boldsymbol{b}+5\boldsymbol{c}$.