Minimum rosette separation distance d_n *vs.* n (n even)

1. Rosettes on square lattice

$$n \equiv 0 \pmod 4: \quad d_n = \frac{1}{\sin\left(\frac{\pi}{2n}\right)} + 2\sum_{k=1}^{(n-4)/4}\left(\frac{n-4k}{4}\right)\cos\left(\frac{2k\pi}{n}\right).$$

$$n \equiv 2 \pmod 4: \quad d_n = \frac{1}{\sin\left(\frac{\pi}{2n}\right)} + 2\sum_{k=1}^{(n-2)/4}\left(\frac{n+2-4k}{4}\right)\cos\left(\frac{2k\pi}{n}\right).$$

Examples:

$$d_2 = \frac{1}{\sin\frac{\pi}{4}}$$

$$d_4 = \frac{1}{\sin\frac{\pi}{8}}$$

$$d_6 = \frac{1}{\sin\frac{\pi}{12}} + 2\cos\frac{2\pi}{6}$$

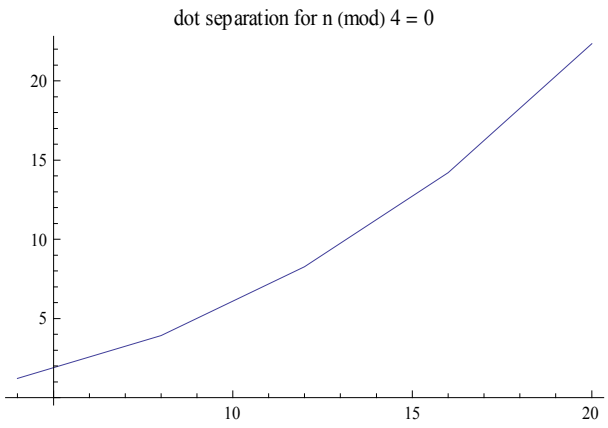
$$d_8 = \frac{1}{\sin\frac{\pi}{16}} + 2\cos\frac{2\pi}{8}$$

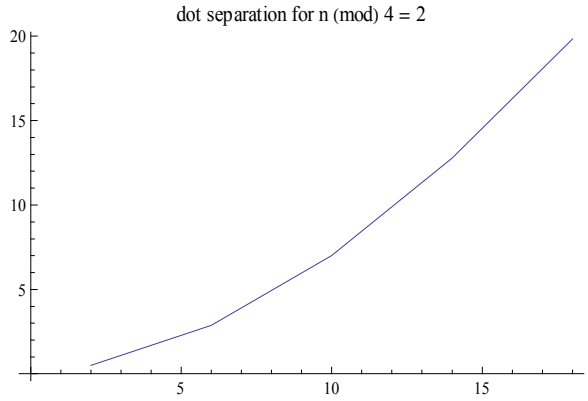
$$d_{10} = \frac{1}{\sin\frac{\pi}{20}} + 2\left(2\cos\frac{2\pi}{10} + \cos\frac{4\pi}{10}\right)$$

$$d_{12} = \frac{1}{\sin\frac{\pi}{24}} + 2\left(2\cos\frac{2\pi}{12} + \cos\frac{4\pi}{12}\right)$$

$$d_{14} = \frac{1}{\sin\frac{\pi}{28}} + 2\left(3\cos\frac{2\pi}{14} + 2\cos\frac{4\pi}{14} + \cos\frac{6\pi}{14}\right)$$

$$d_{16} = \frac{1}{\sin\frac{\pi}{32}} + 2\left(3\cos\frac{2\pi}{16} + 2\cos\frac{4\pi}{16} + \cos\frac{6\pi}{16}\right)$$


dot separation for n (mod) 4 = 0
20
15
10
5
10
15
20


dot separation for n (mod) 4 = 2
20
15
10
5
5
10
15

2. Rosettes on stripes (staggered, even n)

$$d_n = \frac{1}{2\sin\left(\frac{\pi}{2n}\right)} + 2\sum_{k=1}^{(n-2)/2}\left(\frac{n-2k}{2}\right)\cos\left(\frac{(2k-1)\pi}{2n}\right).$$

Examples:

$$d_2 = \frac{1}{\sin(\pi/4)}$$

$$d_4 = \frac{1}{\sin(\pi/8)} + 2[\cos(\pi/8)]$$

$$d_6 = \frac{1}{\sin(\pi/12)} + 2[2\cos(\pi/12) + \cos(3\pi/12)]$$

$$d_8 = \frac{1}{\sin(\pi/16)} + 2[3\cos(\pi/16) + 2\cos(3\pi/16) + \cos(5\pi/16)]$$

$$d_{10} = \frac{1}{\sin(\pi/20)} + 2[4\cos(\pi/20) + 3\cos(3\pi/20) + 2\cos(5\pi/20) + \cos(7\pi/20)]$$

$$d_{12} = \frac{1}{\sin(\pi/24)} + 2[5\cos(\pi/24) + 4\cos(3\pi/24) + 3\cos(5\pi/24) + 2\cos(7\pi/24) + \cos(9\pi/24)]$$