New digital plane thickness with unknown properties

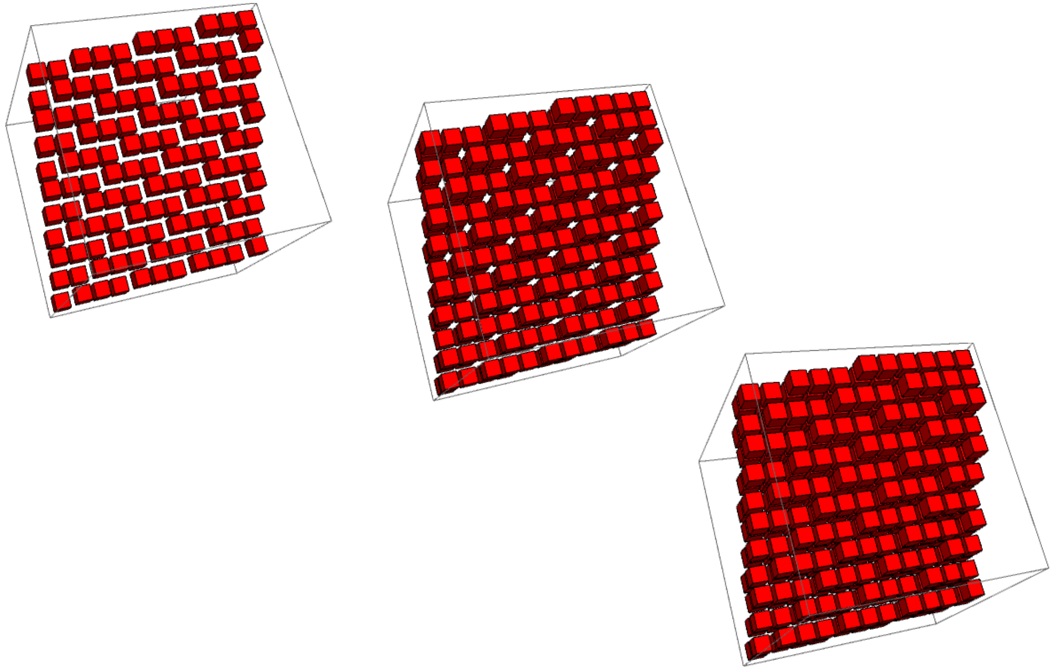
By Eric Andres

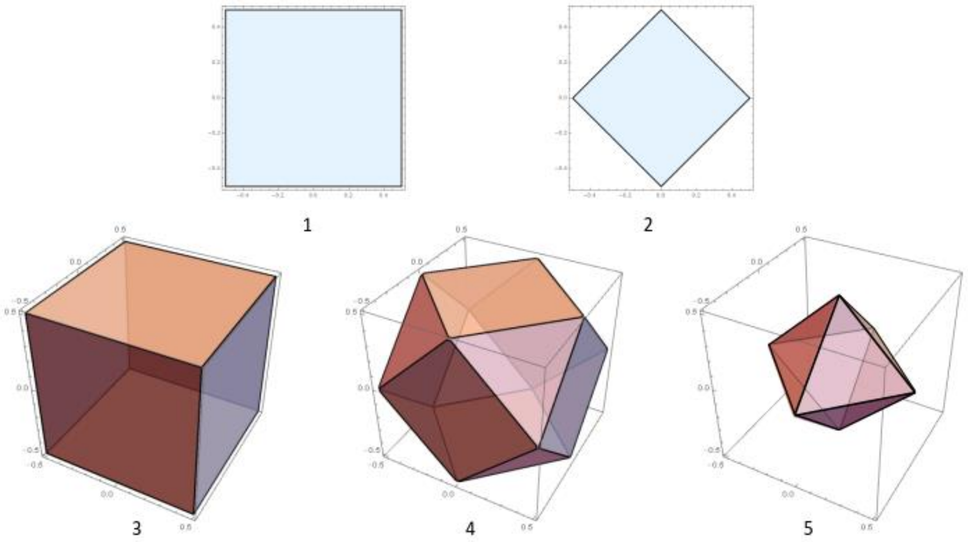
Digital Plane Thickness: $0 \le ax + by + cz + d < \omega$, $0 \le a \le b \le c$

$\omega = c$: 18-connected, thinnest 2-separating

$\omega = c+b$: 6 or 18-connected, thinnest 1-separating

$\omega = c+b+a$: 6-connected, thinnest 0-separating



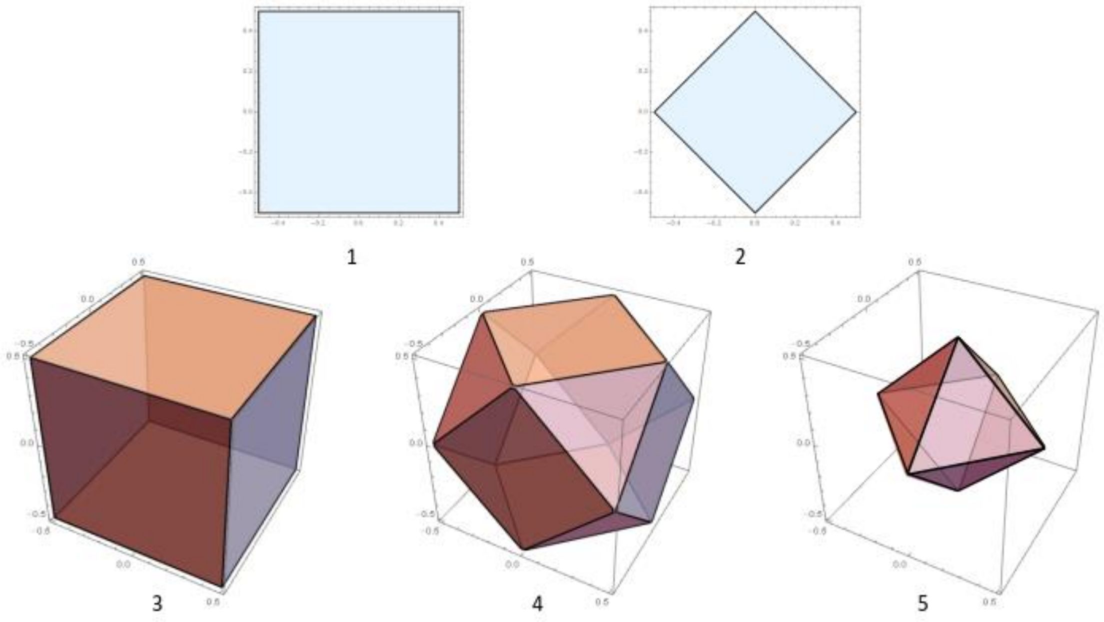


Definition 1 (Adjacency norms [15]) Let n be the dimension of the space. Let k be a positive integer lower than n. The *k-adjacency norm* $[\cdot]_k$ is defined as:

$$\forall x \in \mathbb{R}^n, [x]_k = \max\left\{ \|x\|_\infty, \frac{\|x\|_1}{n-k} \right\}.$$

The name *adjacency norms* stems for the following property:

Lemma 1 (Digital adjacency and adjacency norms [15]) *Let v and $w \in \mathbb{Z}^n$. Then, v and w are k-adjacent* iff $[v-w]_k \leq 1$.



For x=(a,b,c) :

- $[x]_0$ = max(max(a,b,c),(a+b+c)/3 = c
- $[x]_1$ = max(c,(a+b+c)/2)
- $[x]_2$ = max(c,(a+b+c)/1) = a+b+c

Digital Plane Thickness: $0 \leq ax + by + cz + d < \omega$, $0 \leq a \leq b \leq c$

$\omega = c$: 18-connected, thinnest 2-separating, defined with distance $[x]_2$

$\omega = c+b$: 6 or 18-connected, thinnest 1-separating, defined with distance $[x]_1$

$\omega = c+b+a$: 6-connected, thinnest 0-separating, defined with distance $[x]_0$

What About planes with thickness max(c,(a+b+c)/2) defined by distance [x]=b+c ?