

Torsdag 1. oktober

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Oppsummering: Eulers formel $v - e + f = 2$

$$\sum_{\substack{p \\ \text{hjørne}}} \deg p = 2e$$

$$\sum_{\substack{s \\ \text{flate}}} \deg s = 2e$$

Vinkelddefekt $D = \sum_{\substack{p \\ \text{hjørne}}} (2\pi - \sum_{i=1}^n \alpha_{p,i}) = 4\pi$

Regulært polyeder:

- Kongruente regulære polygoner (flate)
- Like hjørnekonfigurasjon

Dualt polyeder: Konvekse innkyling av midtpunkter i alle sideflatene

Regulært: p flater møtes i hvert hjørne
 m -kant: p flater

$$\left. \begin{array}{l} v - e + f = 2 \\ v_p = 2e \\ f_m = 2e \end{array} \right\} \begin{array}{l} v \left(1 - \frac{p}{2} + \frac{p}{m} \right) = 2 \\ \nearrow \\ v \left(2 - \frac{p(m-2)}{m} \right) = 4 \end{array} \quad v(2m - p(m-2)) = 4m$$

$$m = 3$$

$$v(6-p) = 12 \Rightarrow \begin{array}{l} p=5, v=12 \text{ eller } p=4, v=6 \\ \nearrow \quad \quad \quad \nwarrow \\ \begin{array}{l} e=30 \\ f=20 \end{array} \quad \begin{array}{l} \text{eller } p=3, v=4 \\ \nearrow \quad \quad \quad \nwarrow \\ \begin{array}{l} e=6 \\ f=4 \end{array} \end{array} \quad \begin{array}{l} e=12 \\ f=8 \end{array}$$

$$m=4$$

$$V(8-2p)=16$$

$$p=3, v=8$$

$$\rightarrow e=12 \quad f=6$$

$$m=5$$

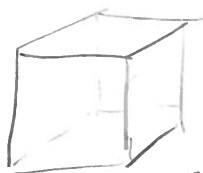
$$V(10-3p)=20$$

$$p=3 \quad v=20$$

$$\rightarrow e=30 \quad f=12$$



Self-dual
tetraeder



kube



dual

oktaeder



dodekaeder



ikosaeder

Archimædiske legemer (semi-regulære)

- ulike mangekanter
- like hjørnekonfigurasjoner

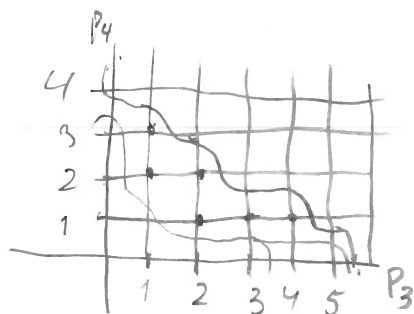
Hjørner: - minst 3 mangekanter P_m m-kanter
- minst 2 ulike

Vinkeldefekt

$$D = V \left(2\pi - \sum_{m=1}^n P_m \frac{m-2}{m} \pi \right) = 4\pi$$

$$\text{eller} \quad V \left(2 - \sum_{m=1}^n P_m \frac{m-2}{m} \right) = 4$$

Eksempel: 3- og 4-kanter: P_3, P_4



$$V \left(2 - \frac{P_3}{3} - \frac{P_4}{2} \right) = 4$$

$$\Leftrightarrow V(12 - 2P_3 - 3P_4) = 24$$

P_3	P_4	$12 - 2P_3 - 3P_4$	V	e	f	
1	2	4	6	9	5	3-kanteret prisme
1	3	1	24	48	26	Rhombicube octahedron
2	1	5	-			
2	2	2	12	24	14	Cubeoctahedron
3	1	3	8	16	10	4-anti prisme
4	1	1	24	60	38	snub cube

3-, 4- og 5-kanter

$$V \left(2 - \frac{P_3}{3} - \frac{P_4}{2} - \frac{3P_5}{5} \right) = 4$$

$$V \cdot \beta = V (60 - 10P_3 - 15P_4 - 18P_5) = 120$$

P_3	P_4	P_5	β
1	1	1	17
2	1	1	7
1	2	1	2
1	1	2	-1

$$V = 60 \quad e = 120 \quad f = 62$$

Rhombicosidodecahedron

20 trekanter
30 firkanter
12 femkanter

Avkuttet ikosaedron

12 5-kanter

20 6-kanter

$$P_5 = 1 \quad P_6 = 2 \quad \beta = 2 - \frac{3}{5} - \frac{4}{3} = \frac{1}{15} \Rightarrow V = 60$$

$$e = 90$$

$$f = 32$$