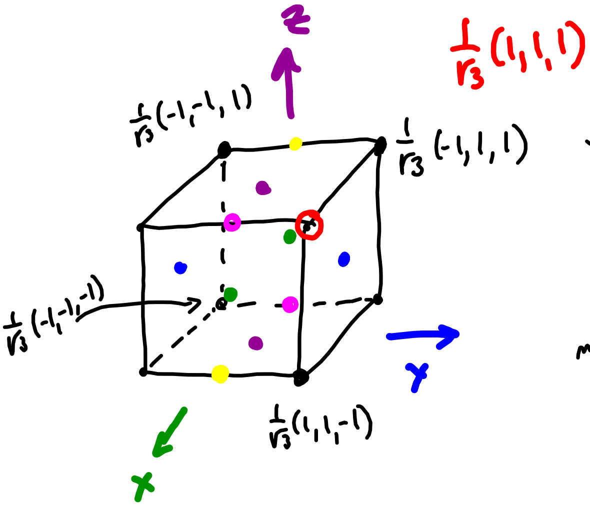
MAT 2500 22.09.2020



G rotasjonsgruppen

a) $\mathcal{P}$ polmengden til G

$\mathcal{P} = \{p \mid p$ er en pol for en rotasjon $g \in G\}$

Punkter der hvor rotasjonsaksene møter kuben

midtp på flater

Aksene: $\frac{1}{\sqrt{3}}(0,0,\pm 1)$ $\frac{1}{\sqrt{3}}(0,\pm 1,0)$ $\frac{1}{\sqrt{3}}(\pm 1,0,0)$

6

Hjørnene: De 8 hjørnene

Midt på kanter

$\frac{1}{\sqrt{3}}(\pm 1,0,\pm 1)$ $\frac{1}{\sqrt{3}}(\mp 1,0,\pm 1)$

12 $\frac{1}{\sqrt{3}}(\pm 1,\pm 1,0)$ $\frac{1}{\sqrt{3}}(\mp 1,\pm 1,0)$

$\frac{1}{\sqrt{3}}(0,\pm 1,\pm 1)$ $\frac{1}{\sqrt{3}}(0,\mp 1,\pm 1)$

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26 punkter i polmengden

G : Aksene : $\rho_0 = id$ 1 Hjørner Midt på kanter

3	$\rho_{\frac{\pi}{2}}, \rho_\pi, \rho_{\frac{3\pi}{2}}$	3	4	$\rho_{\frac{2\pi}{3}}, \rho_{\frac{4\pi}{3}}$	2	6	ρ_π	1

id: 1   9   8   6

24 elementer i G

$$G_p = \{ g(p) \mid g \in G \}$$

Velg $p_1 = \frac{1}{\sqrt{3}}(0,0,1)$

$G_{p_1} = p_1$

y-aksen:

$\rho_{\frac{\pi}{2}}(p_1) = \frac{1}{\sqrt{3}}(1,0,0)$

$\rho_\pi(p_1) = \frac{1}{\sqrt{3}}(0,0,-1)$

$\rho_{\frac{3\pi}{2}}(p_1) = \frac{1}{\sqrt{3}}(-1,0,0)$

x-aksen

$\rho_{\frac{\pi}{2}}(p_1) = \frac{1}{\sqrt{3}}(0,-1,0)$

$\rho_\pi(p_1) = \frac{1}{\sqrt{3}}(0,0,-1)$

$\rho_{\frac{3\pi}{2}}(p_1) = \frac{1}{\sqrt{3}}(0,1,0)$

Hjørnene

$(1,1,1) \leftrightarrow (-1,-1,-1)$

$\rho_{\frac{2\pi}{3}}(p_1) = \frac{1}{\sqrt{3}}(1,0,0)$ og tilsvarende

$\rho_{\frac{4\pi}{3}}(p_1) = \frac{1}{\sqrt{3}}(0,1,0)$

Kantene

$x=y$

$\rho_\pi(p_1) = \frac{1}{\sqrt{3}}(0,0,-1)$ og tilsvarende

Banen til p_1 er alle midtpunkter på flatene.

p_2 = hjørne : $G_{p_2} = \{$ Alle hjørnene i kuben $\}$

p_3 = midt på kant : $G_{p_3} = \{$ Alle midtpunkter på kanter $\}$

Se på setning 3.8. $24 = |G_x| \cdot |Gx| = |G|$

9 - 1 5.10.1

$$25x^2 + 9y^2 - 18x + 2y = 0$$

Fullføre kvadrat

$$(5x)^2 - 2\cdot\boxed{\frac{9}{5}}\cdot 5x + \underbrace{\left(\frac{9}{5}\right)^2 - \left(\frac{9}{5}\right)^2}_{+0}$$

$$\left(2\cdot 9\cdot \frac{5}{5}x\right)$$

$$+ (3y)^2 + 2\cdot\frac{1}{3}\cdot 3y + \underbrace{\left(\frac{1}{3}\right)^2 - \left(\frac{1}{3}\right)^2}_{+0} = 0$$

Skal finne sentrum halvakser

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

$$\frac{(x-s_x)^2}{a^2} + \frac{(y-s_y)^2}{b^2} = 1$$

$S = (s_x, s_y)$

halvakser a og b

$$(m+n)^2 = m^2 + 2mn + n^2$$

$$\left(5x - \frac{9}{5}\right)^2 - \left(\frac{9}{5}\right)^2 + \left(3y + \frac{1}{3}\right)^2 - \left(\frac{1}{3}\right)^2 = 0$$

$$5^2\left(x - \frac{9}{25}\right)^2 + 3^2\left(y + \frac{1}{9}\right)^2 = \frac{9^2}{5^2} + \frac{1^2}{3^2} = \frac{9^3 + 5^2}{5^2\cdot 3^2} = \frac{754}{5^2\cdot 3^2}$$

$$\frac{\left(x - \frac{9}{25}\right)^2}{\frac{1}{5^2}} + \frac{\left(y + \frac{1}{9}\right)^2}{\frac{1}{3^2}} = \frac{754}{5^2\cdot 3^2} \quad \Big| : \frac{754}{5^2\cdot 3^2}$$

$$\frac{\left(x - \frac{9}{25}\right)^2}{\frac{754}{5^4\cdot 3^2}} + \frac{\left(y + \frac{1}{9}\right)^2}{\frac{754}{5^2\cdot 3^4}} = 1$$

Sentrum : $\left(\frac{9}{25}, -\frac{1}{9}\right)$

Halvakser : $\dfrac{\sqrt{754}}{5^2\cdot 3}$, $\dfrac{\sqrt{754}}{5\cdot 3^2}$