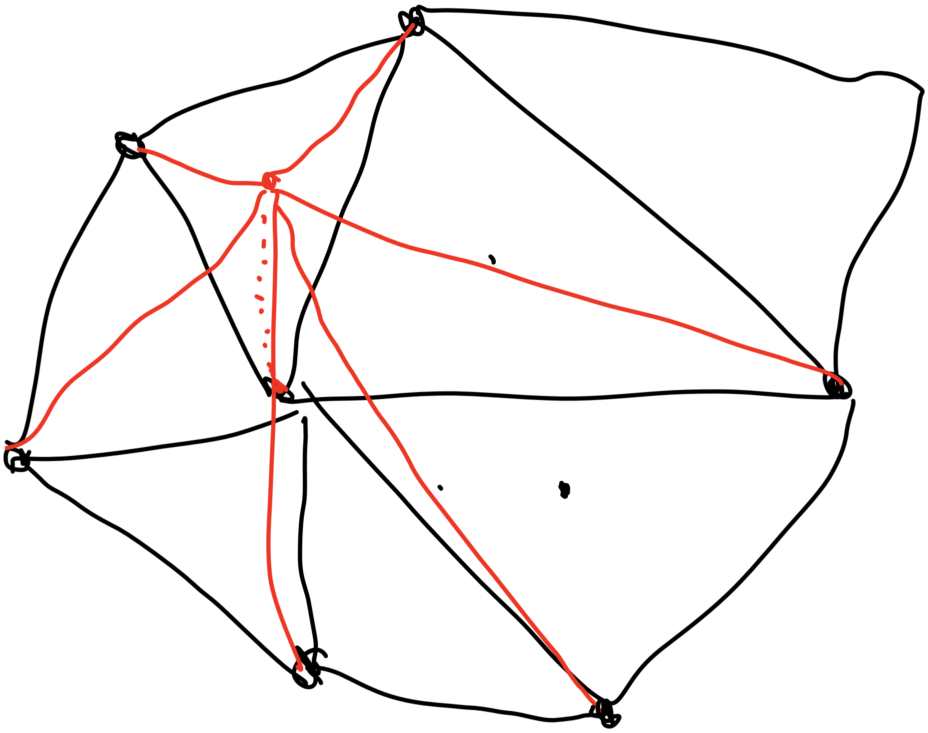


→ Find element

Claim 1: $\{\psi_n\}$ $L^2(T)$

Then $\{Re(\psi_n), Im(\psi_n)\}$ is a real basis for

	λ^2
1	0
$e^{\pm ix}, e^{\pm iy}$	1
$e^{\pm ix}e^{\pm iy}$	2

$$f = \alpha_1 1 + \alpha_2 e^{ix} + \alpha_3 e^{-ix} + \alpha_4 e^{iy} + \alpha_5 e^{-iy} + \alpha_6 e^{ix+iy}$$

$\alpha_1 = \lambda_{n,m} \xi_{n,m} \leftarrow$ real

$$f = f_1 + i f_2$$

$$\begin{aligned} g = f_1 + f_2 = \alpha_1 1 &+ \alpha_2(\cos(x)+\sin(x)) \\ &+ \alpha_3(\cos(x)-\sin(x)) \\ &+ \alpha_4(\cos(y)+\sin(y)) \\ &+ \alpha_5(\cos(y)-\sin(y)) \\ &+ \alpha_6\big(Re(e^{ix})Re(e^{iy}) - Im(e^{ix})Im(e^{iy}) \\ &\quad + Re(e^{ix})Im(e^{iy}) + Im(e^{ix})Re(e^{iy})\big) \end{aligned}$$

f

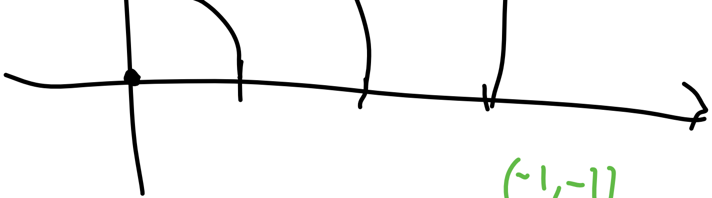
(1,1) $$\alpha_6\big(\cos(x)\cos(y) - \sin(x)\sin(y) + \cos(x)\overset{\psi_1}{\sin(y)} + \overset{\varphi_2}{\sin(x)}\cos(y)\big)$$

$$\left\{\begin{array}{l} \cos(nx)\cos(my) \\ \cos(nx)\sin(my) \\ \sin(nx)\cos(my) \\ \sin(nx)\sin(my) \end{array}\right.$$

$n = 0 \ldots N, \quad m = 0 \ldots N$

(-1,1) $$\alpha_7\big(\overset{\psi_3}{\cos(x)\cos(y)} + \overset{\varphi_4}{\sin(x)\sin(y)} + \cos(x)\sin(y) - \sin(x)\cos(y)\big)$$

(1,-1) $$\alpha_8\big(\cos(x)\cos(y) + \sin(x)\sin(y)$$



(y)

$\sim \cos(x)\sin(y) + \sin(x)\cos(y)|$

$(-1,-1)$ $\alpha_9 \big(\cos(x)\cos(y) - \sin(x)\sin(y)$

$\sim \cos(x)\sin(y) - \sin(x)\cos(y)|$

$\|(m,n)\|^2 = 2$

$$\left.\begin{aligned}
&\psi_1 \overbrace{(\alpha_6 + \alpha_7 + \alpha_8 + \alpha_9)}^{\xi_1} \\
+\ &\psi_2 \overbrace{(-\alpha_6 + \alpha_7 + \alpha_8 - \alpha_9)}^{\xi_2} \\
+\ &\psi_3 \overbrace{(\alpha_6 + \alpha_7 - \alpha_8 - \alpha_9)}^{\xi_3} \\
+\ &\psi_4 \overbrace{(\alpha_6 - \alpha_7 + \alpha_8 - \alpha_9)}^{\xi_4}
\end{aligned}\right\} \text{Gaussian Vector} \begin{bmatrix} \xi_1 \\ \xi_2 \\ \xi_3 \\ \xi_4 \end{bmatrix}$$

$$\xi_i \sim N(0,4)$$

$$\mathbb{E}[\xi_1 \xi_2] = \mathbb{E}\left[-\alpha_6^2 + \alpha_7^2 + \alpha_8^2 - \alpha_9^2\right]$$

$$= -1 + 1 + 1 - 1 = 0$$

$$\mathbb{E}[\xi^T \xi] = 4I$$

Mål: Givet $N = 2^k + 1$ og $M = 2^c$ $k \geq c$

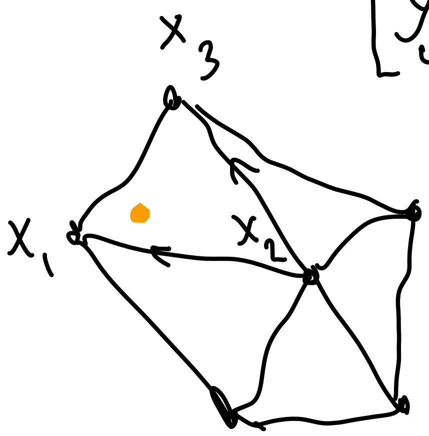
fyld matrix med egenværdier

$$-\Delta\left(e^{inx}e^{imy}\right) = \underbrace{(n^2+m^2)}_{\lambda}e^{inx}e^{imy}$$

$w(xq, yq) = $ zeros

For each element

$$\begin{array}{ccc} \begin{bmatrix} x_1 \\ y_1 \\ w_1 \end{bmatrix}, & \begin{bmatrix} x_2 \\ y_2 \\ w_2 \end{bmatrix}, & \begin{bmatrix} x_3 \\ y_3 \\ w_3 \end{bmatrix} \\ a & b & c \end{array}$$



$$n = (a-b)\times(c-b), \quad n = \frac{n}{n_3}.$$

$$=$$

$$0 = n_1(x_q - x_2) + n_2(y_q - y_2) + n_3(w(x_q, y_q) - w_2)$$

$$w(x_q, y_q) = -n_1(x_q - x_2) - n_2(y_q - y_2) + w_2$$

1. which points → inpolygon
2. remove those from (xq, yq

... from (x_q, y_q)

3. Find nodes for this elem. EtoV
   a, b, c

4. Compute n. $n = \frac{n}{n_3}$.

5. $w(x_q, y_q) = -n_1(x_q - x_2) - n_2(y_q - y_2) + w_2$

6. Insert in w.