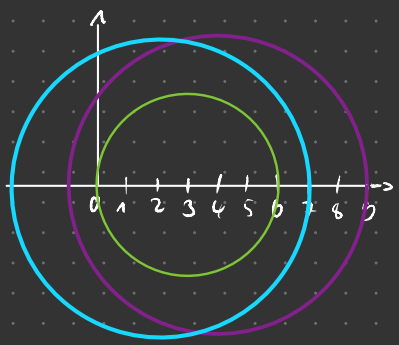
Numerik HA07 Gruppe 6

A2

Aufgabe 2.

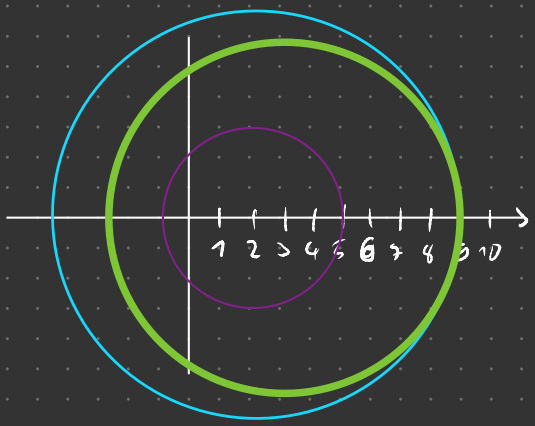
$$A = \begin{pmatrix} 4 & -2 & 3 \\ 3 & 2 & -2 \\ 2 & -1 & 3 \end{pmatrix}$$

Zeile	Mittel Punkt a_{ii}	Radius $\sum |a_{ij}|_{j=i}$
1	4	5
2	2	5
3	3	3



$$A^T = \begin{pmatrix} 2 & 3 & 4 \\ -1 & 2 & -2 \\ 3 & -2 & 3 \end{pmatrix}$$

Zeile	Mittel Punkt a_{ii}	Radius $\sum |a_{ij}|_{j=i}$
1	2	7
2	2	3
3	3	6



A4 $A = \begin{pmatrix} 10 & 15 & 20 \\ 15 & -50 & 25 \\ 20 & 25 & -75 \end{pmatrix}$

$v_1 = \begin{pmatrix} 15 \\ 20 \end{pmatrix}$

$\Rightarrow c = \frac{v_1}{\|w\|_2} = \frac{15}{\sqrt{15^2+20^2}} = \frac{15}{25} = \frac{3}{5}$

$\Rightarrow s = \frac{v_2}{\|w\|_2} = \frac{20}{\sqrt{15^2+20^2}} = \frac{20}{25} = \frac{4}{5}$

$\tilde{Q} = \begin{pmatrix} \frac{3}{5} & \frac{4}{5} \\ -\frac{4}{5} & \frac{3}{5} \end{pmatrix} \Rightarrow Q_1 = \begin{pmatrix} 1 & 0 & 0 \\ 0 & \frac{3}{5} & \frac{4}{5} \\ 0 & -\frac{4}{5} & \frac{3}{5} \end{pmatrix}$

$H = Q_1 A Q_1^T = \begin{pmatrix} 1 & 0 & 0 \\ 0 & \frac{3}{5} & \frac{4}{5} \\ 0 & -\frac{4}{5} & \frac{3}{5} \end{pmatrix} \begin{pmatrix} 10 & 15 & 20 \\ 15 & -50 & 25 \\ 20 & 25 & -75 \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 \\ 0 & \frac{3}{5} & \frac{4}{5} \\ 0 & -\frac{4}{5} & \frac{3}{5} \end{pmatrix}^T = \begin{pmatrix} 10 & 25 & 0 \\ 25 & -42 & -19 \\ 0 & -19 & -83 \end{pmatrix}$