HW13-2

$$A_N = N^2 \begin{bmatrix} -2 & 1 & & & \\ 1 & -2 & 1 & & 0 \\ & \ddots & \ddots & \ddots & \\ & & 1 & -2 & 1 \\ & 0 & & 1 & -2 \end{bmatrix}_{(N-1)\times(N-1)}$$

$$B_N = \begin{bmatrix} 1 & N/2 & 0 & & \\ -N/2 & 1 & N/2 & & \\ & \ddots & \ddots & \ddots & \\ & & -N/2 & 1 & N/2 \\ & & & -N/2 & 1 \end{bmatrix}_{(N-1)\times(N-1)}$$

From code, HW13-2

$$\Rightarrow K(A_N) \approx c_1 N^2 \approx O\left(\frac{1}{h^2}\right)$$

$$K(B_N) \approx c_2 N \approx O\left(\frac{1}{h}\right)$$