

Case I.(A) Assumption I

$$\begin{aligned} 2\Delta &\leq n + 1 \\ 2\Delta &\leq n + m - 2\ell \end{aligned} \quad \text{or}$$

Assumption A:

$$4 \leq 2\ell \leq m + 1$$

No escape:

$$\Delta \leq m - \ell + 1$$

Encircle:

$$2\Delta \geq m - 2\ell - 1$$

Case I.(B) Assumption I

$$\begin{aligned} 2\Delta &\leq n - m + 2\ell \\ 2\Delta &\leq n - 1 \end{aligned} \quad \text{or}$$

Assumption B:

$$m + 1 \leq 2\ell \leq 2m - 2$$

No escape:

$$\Delta \leq \ell$$

Encircle:

$$2\ell - m + 1 \leq 2\Delta$$

Case II.(A) Assumption II

$$\max\{n - m + 2\ell, n - 1\} \leq 2\Delta$$

Assumption A.

$$4 \leq 2\ell \leq m + 1$$

No Escape:

$$\Delta \leq n - m + \ell$$

Encircle:

$$2\Delta \leq 2n + 2\ell - m - 1$$

Case II.(B) Assumption II:

$$n + 1 \leq 2\Delta$$

Assumption B.

$$m + 1 \leq 2\ell \leq 2m - 2$$

No Escape:

$$\Delta \geq n - \ell - 1$$

To Encircle:

$$2\Delta \leq 2n + m - 2\ell + 1$$