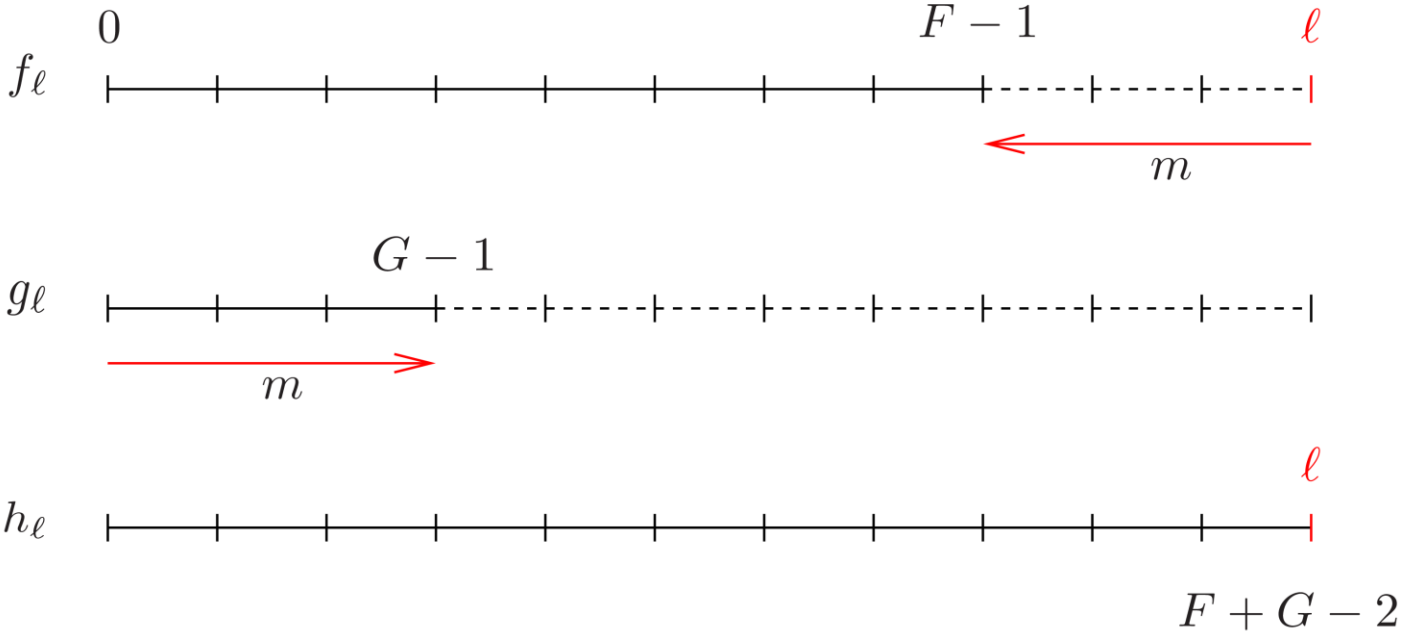
Cyclic vs. linear convolution

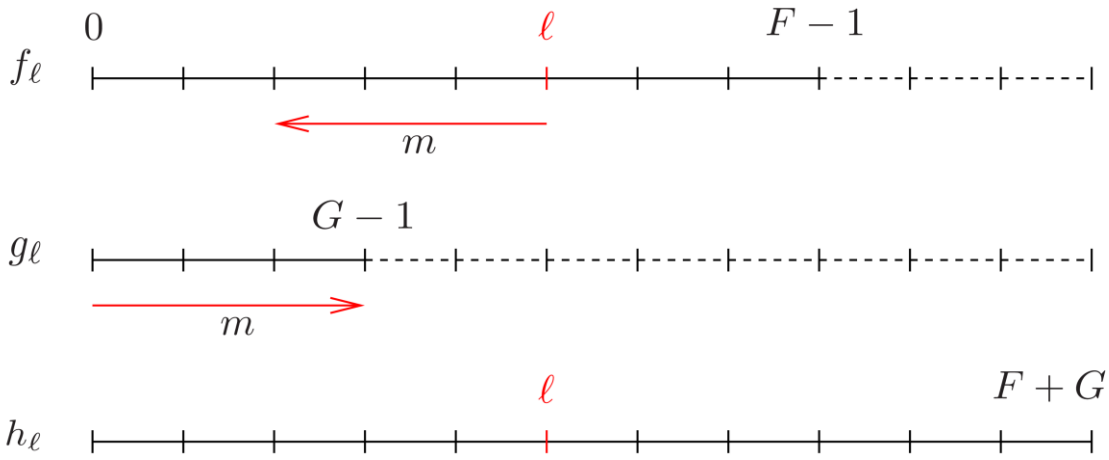
Beispiel: $G = 4,\ F = 9,\ F + G - 2 = 11$

Fall $\ell = F + G - 2$



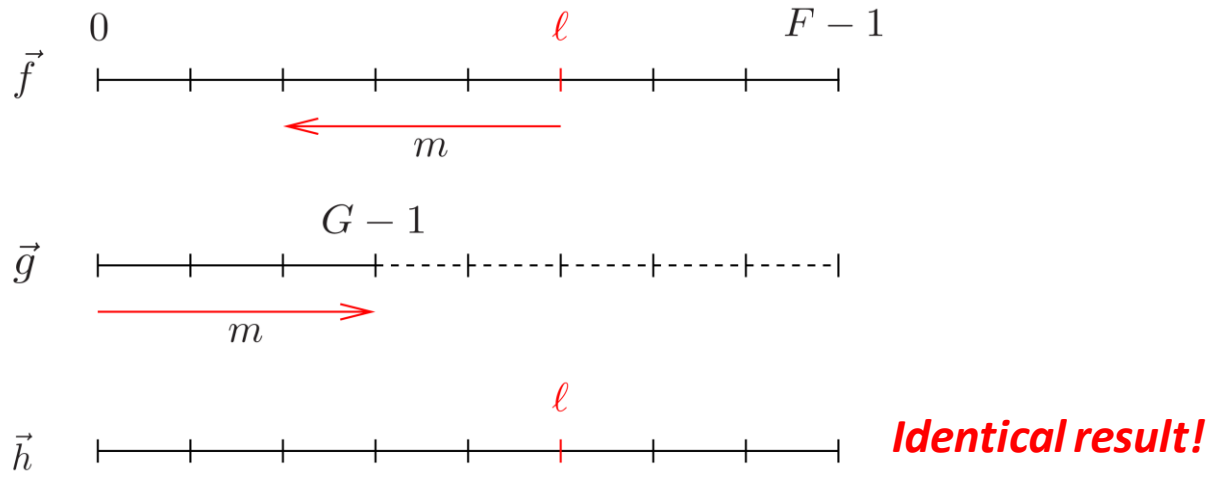
$$h = f * g \qquad\qquad h_\ell = 0 \text{ für } \ell \notin [0, F + G - 2]$$

Fall $\ell = 5$



linear convolution

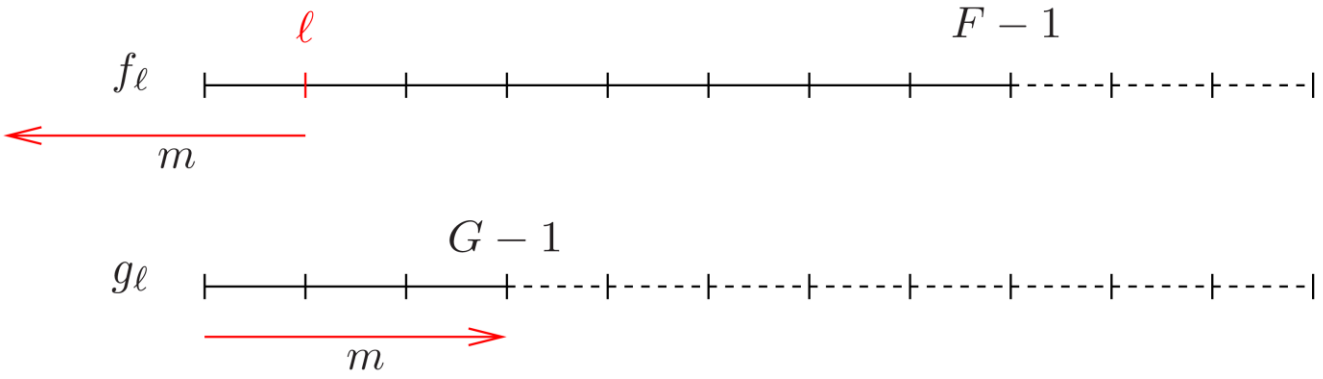
Fall $\ell = 5$



cyclic convolution

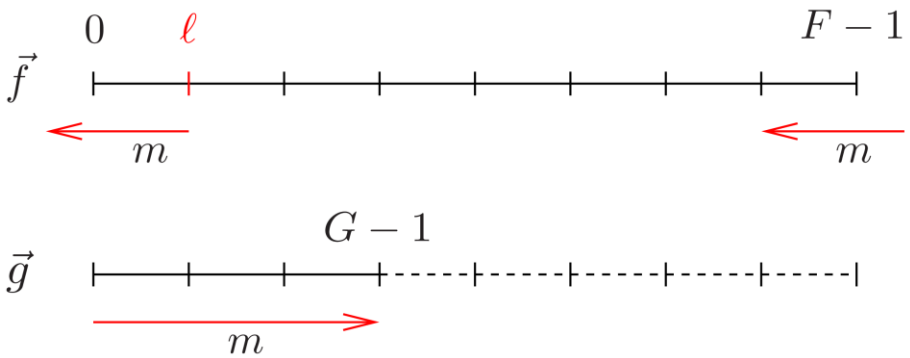
Identical result!

Fall $\ell = 1$



linear convolution

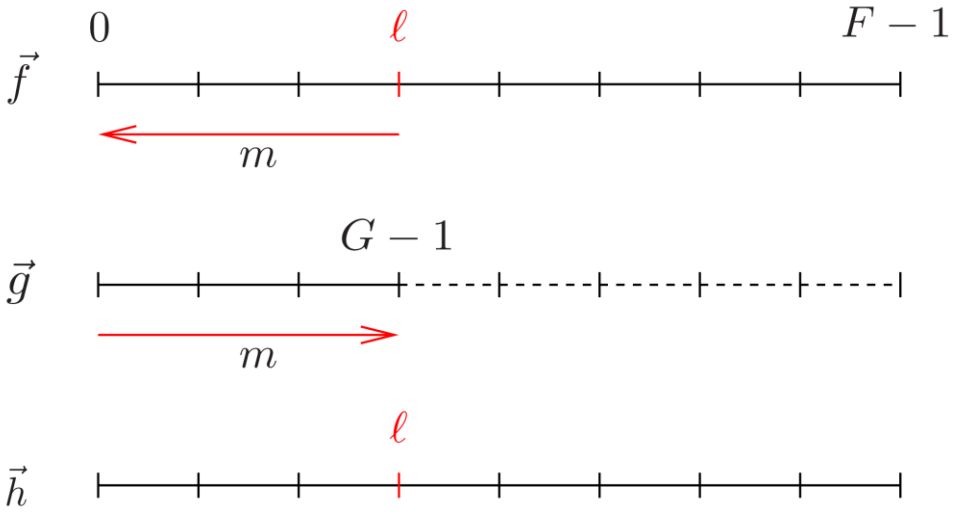
Fall $\ell = 1$



cyclic convolution

Different result!

Fall $\ell = 3$



cyclic convolution

Edge case: Identical result!

Ergebnis gleich für $\ell = G-1, \ldots, F-1$

Blockweise Berechnung von $h = f * g$

$$G = 4, \qquad F = 9, \qquad \Delta = F - G + 1 = 6$$