從信號與系統到控制

單元：離散摺積-3

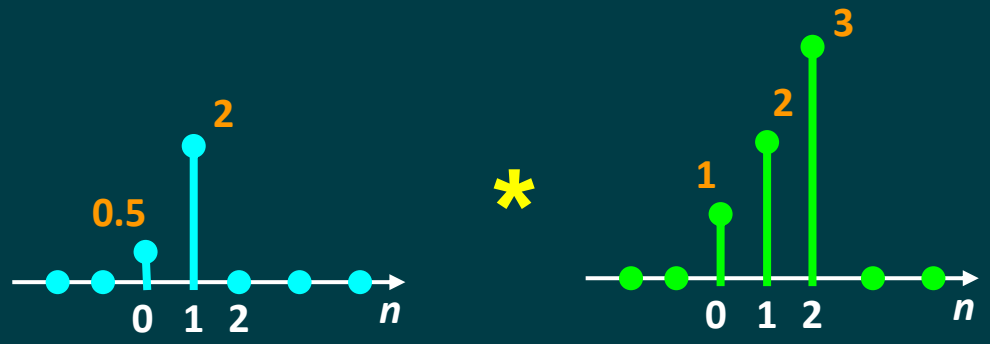
離散摺積計算-以輸入時間觀點

授課老師：連　豐　力

單元學習目標與大綱

- 離散摺積計算範例
- 以輸入信號時間軸為觀點
- 以輸出信號時間軸為觀點

離散摺積計算

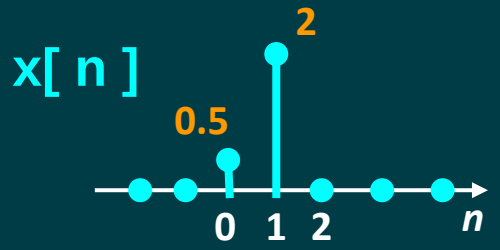


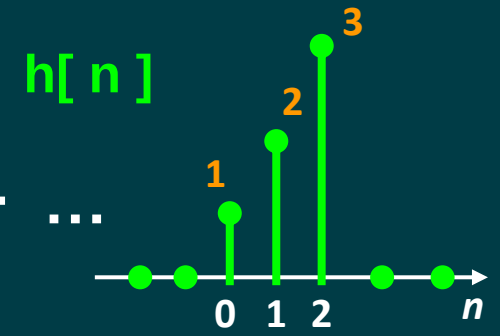
$$x[n] * h[n] = y[n]$$

$$= \sum_{k=-\infty}^{+\infty} x[k]\, h[n-k]$$

離散摺積計算-以輸入時間觀點

$$y[n] = \sum_{k=-\infty}^{+\infty} x[k]\, h[n-k]$$





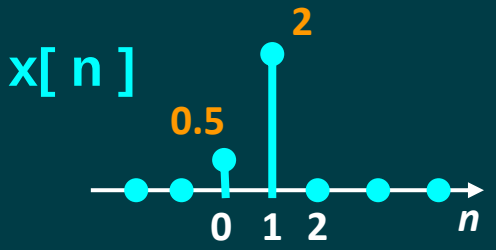
$$= \ldots + x[-1]\,h[n+1] + x[0]\,h[n] + x[1]\,h[n-1] + x[2]\,h[n-2] + \ldots$$

$$= \ldots + 0\,h[n+1] + 0.5\,h[n] + 2\,h[n-1] + 0\,h[n-2] + \ldots$$

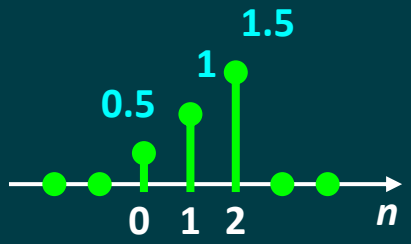
離散摺積計算-以輸入時間觀點

= 0.5 h[n] + 2 h[n-1]

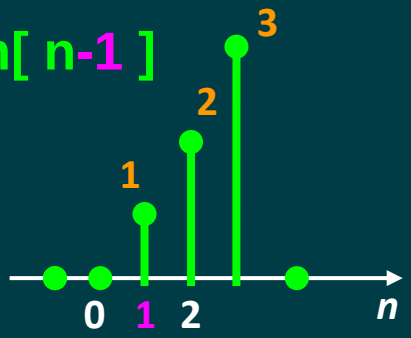
x[n]



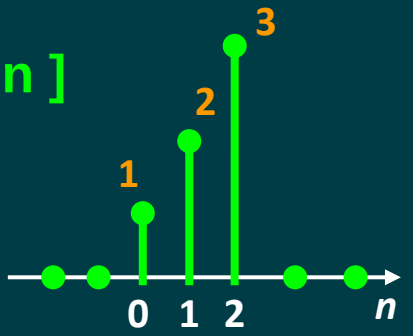
0.5 h[n]



h[n-1]



h[n]

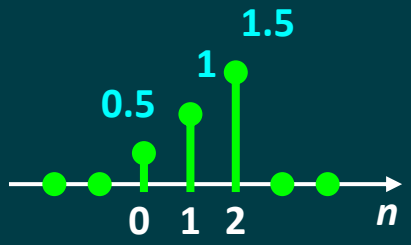


2 h[n-1]

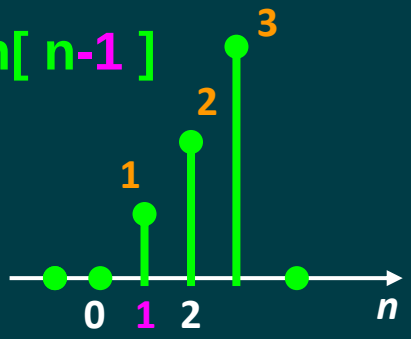
離散摺積計算-以輸入時間觀點

= 0.5 h[n] + 2 h[n-1]

0.5 h[n]

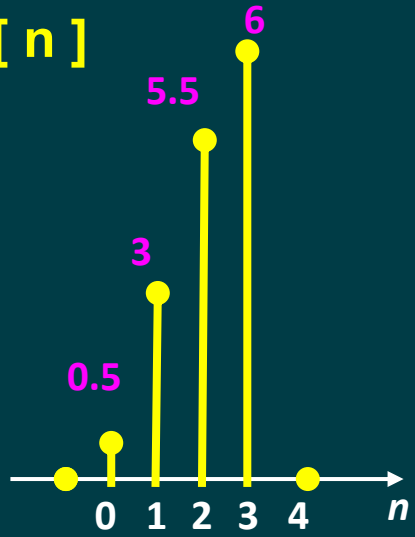


h[n-1]



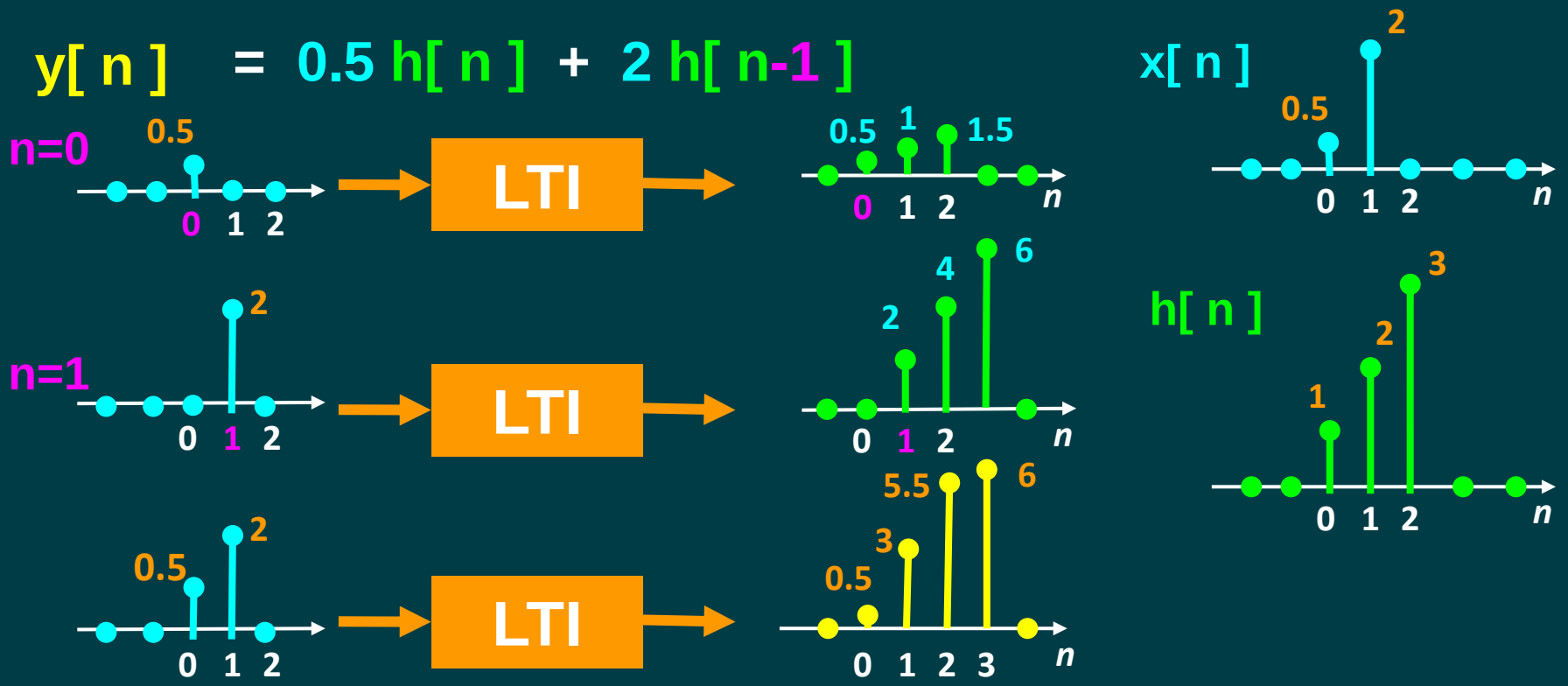
2 h[n-1]

y[n]



離散摺積計算-以輸入時間觀點

$$y[n] = 0.5\,h[n] + 2\,h[n-1]$$



參考文獻

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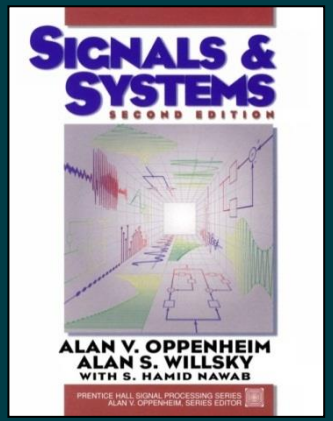

- **SciLab**:
  Open source software for numerical computation
  http://www.scilab.org/