4. Transfer functions, differens ligning, Pol/nul-punkter, Stabilitet og realisationstrukture

$$TF = H(z) = \frac{Y(z)}{X(z)}$$ ← output, ← input

Der er ikke noget jeg ikke ved når jeg har TF

$H(z)\big|_{z=e^{j\omega}} \Rightarrow$ Frekvensrespons

Amp $= |H(e^{j\omega})|$

Phase $= \angle H(e^{j\omega})$

$$\boxed{\text{general Diff. Eq.} \quad y[n] = \left(\sum_{k=0}^{M} b_k\, x[n-k]\right) + \left(\sum_{l=1}^{N} a_l\, y[n-l]\right)}$$

TF $\Rightarrow$ differensligning

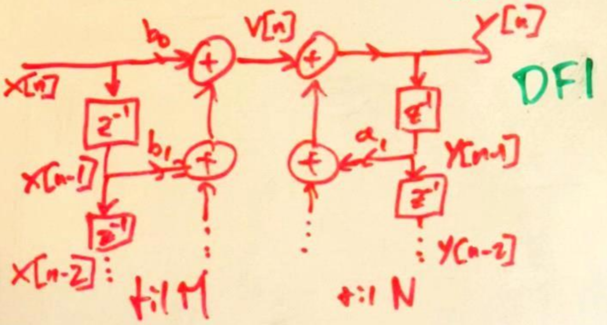
$$H(z) = \frac{1}{1-z^{-1}} \xrightarrow{\text{diff. lign.}} y[n] = y[n-1] + x[n]$$

$$H(z) = \frac{B(z)}{A(z)} = \frac{\sum_{k=0}^{M} b_k z^{-k}}{1-\sum_{l=1}^{N} a_l z^{-1}}$$

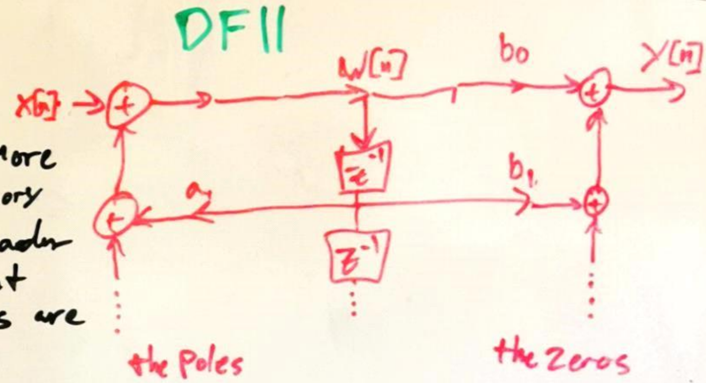
Bruger denne for at gå fra $H(z) \Rightarrow$ diff.lign.

1- er fordi Y er delayet

realisationsStrukture: Se Slide 41 / Lec 4



DFII more efficient memory usage but harder to implement since 2 delays are merged



Pol/nul-punkter, Stabilitet

find pol/nul fra $H(z)$ har indflydelse på Stabilitet → indenfor enheds Cirklen

↙ rødder $X(z)$ ↘ rødder $Y(z)$