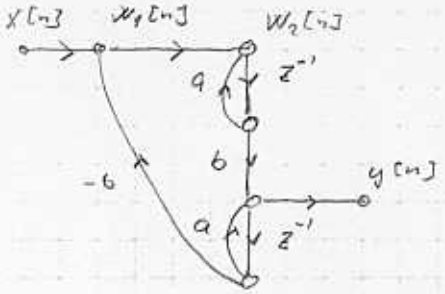
Opg 6.1 network II sidi



$$W_1(z) = X(z) - b\,z^{-1}Y(z) \qquad (1)$$

$$W_2(z) = W_1(z) + a\,z^{-1}W_2(z) \qquad (2)$$

$$Y(z) = z^{-1}b\,W_2(z) + a\,z^{-1}Y(z) \qquad (3)$$

$$(3): \quad W_2(z) = Y(z)\,\frac{1-az^{-1}}{bz^{-1}} \qquad (4)$$

$$(2)+(1): \quad W_1(z) = W_2(z)(1-az^{-1}) = Y(z)\,\frac{(1-az^{-1})^2}{bz^{-1}} \qquad (5)$$

$$(1)+(5): \quad X(z) - bz^{-1}Y(z) = Y(z)\,\frac{(1-az^{-1})^2}{bz^{-1}} \qquad (6)$$

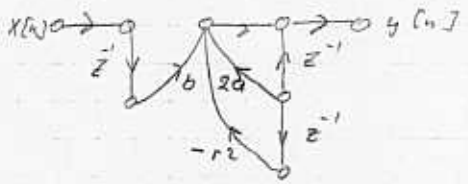
$$(6): \quad Y(z)\left(bz^{-1} + \frac{(1-az^{-1})^2}{bz^{-1}}\right) = X(z)$$

$$\frac{Y(z)}{X(z)} = H(z) = \frac{1}{bz^{-1} + \frac{(1-az^{-1})^2}{bz^{-1}}} = \frac{bz^{-1}}{b^2z^{-2} + 1 - 2az^{-1} + a^2z^{-2}}$$

$$H(z) = \frac{bz^{-1}}{1 - 2az^{-1} + (a^2+b^2)z^{-2}} = \frac{r\sin(\theta)\,z^{-1}}{1 - 2r\cos(\theta) + r^2z^{-2}}$$

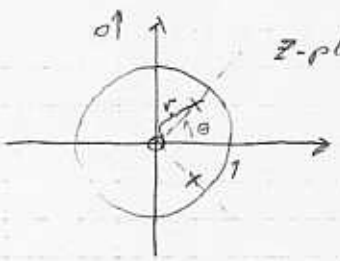
$a = r\cos(\theta)$, $b = r\sin(\theta)$

$$H(z) = \frac{r\sin(\theta)\,z}{z^2 - 2r\cos(\theta)z + r^2}$$

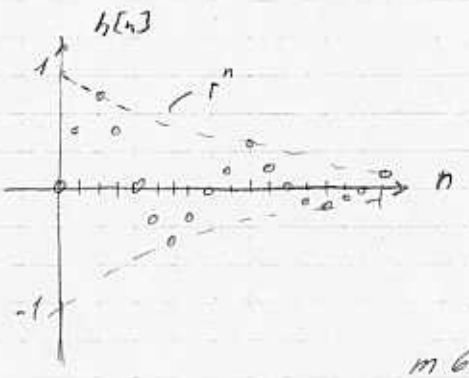


nulpkt.: $z = 0 \quad \vee \quad z \to \infty$

poler: $z = r\cos(\theta) \pm \sqrt{r^2\cos^2(\theta) - r^2} = r\cos(\theta) \pm j\,r\sin(\theta) = r\,e^{\pm j\theta}$



$$h[n] = r^n \cdot \sin(\theta n)\,u[n]$$



m 61 sin.m