Kingsbury, Non Linear!

$$H(z) = \frac{N(z)}{1-(2-z_1 z_2 - z_1^3)z^{-1} + (1-z_1 z_2)z^{-2}}$$

$$\begin{cases} z_1 = \sqrt[3]{1+b_1+b_2} \\ z_2 = \dfrac{1-b_2}{z_1} \end{cases}$$

yields $\Rightarrow H(z) = \dfrac{N(z)}{1-(\cancel{2}-\cancel{1}-\cancel{b_2}-\cancel{1}+b_1+\cancel{b_2})z^{-1}+(\cancel{1}-(\cancel{1}-b_2))z^{-2}}$

$$= \frac{N(z)}{1-(b_1)z^{-1}+(b_2)z^{-2}} \quad //$$

choose: $z_1 = \sqrt[3]{d^2}$, $d = \sqrt{1-2r\cos(\varphi)+r^2}$

$z_1 = \sqrt[3]{1-2r\cos(\varphi)+r^2}$,

$z_2 = \dfrac{1-r^2}{z_1}$

$$H(z) = \frac{N(z)}{1-(2-\cancel{z_1 z_2}(1-r^2)-(1-2r\cos(\varphi)+r^2))z^{-1}+(1-(1-r^2))z^{-2}}$$

$$H(z) = \frac{N(z)}{1-(\cancel{2}-\cancel{1}+\cancel{r^2}-\cancel{1}+2r\cos(\varphi)-\cancel{r^2})z^{-1}+(r^2)z^{-2}}$$

$$= \frac{N(z)}{1-2r\cos(\varphi)z^{-1}+r^2 z^{-2}}$$