A 2.3

$$y[n] = \left(x * h_1 * h_2\right)[n]$$

falls h_1, h_2 für sich stabil: Vertauschung d. Teilsysteme möglich ($|\alpha| < 1$)

$$y[n] = \left(x * h_2 * h_1\right)[n]$$

$$\left(x * h_2\right)[n] = \sum_{k=-\infty}^{\infty} \alpha^k \sigma[k] \left\{ \delta[n-k] - \alpha\, \delta[n-1-k] \right\} =$$

$$= \alpha^n \sigma[n] - \alpha\, \alpha^{n-1} \sigma[n-1] = \alpha^n \left\{ \sigma[n] - \sigma[n-1] \right\} = \alpha^n \delta[n] = \delta[n]$$

$$y[n] = \sum_{k=-\infty}^{\infty} \left(\frac{1}{2}\right)^{|k|} \sin^2\left(\frac{\pi}{10} k\right) \alpha^{n-k} \delta[n-k] = \left(\frac{1}{2}\right)^{|n|} \sin^2\left(\frac{\pi}{10} n\right) \cdot \alpha^0 = h_A[n]$$