

Student name:

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- d) One possible system that can implement the zoom operation is shown in the next figure 1. Assume that $h(n)$ is a discrete time ideal low pass filter with cutoff frequency Δf . What is the largest (Possibly no integer) value of M that can be used if aliasing is to be avoided in the down sampler? (3 points)

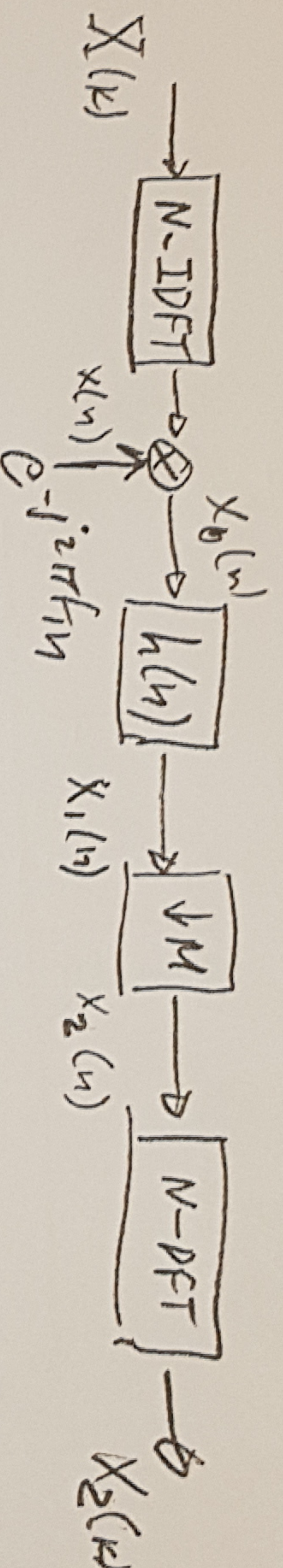


Fig. 1

Since $h(n)$ has a cutoff rate of Δf and we know that M will result in frequency down expansion of M times to avoid aliasing we should choose

$$M \leq \frac{1}{2\Delta f}$$