4.25 If the input values are repeated L times, the corresponding spectrum is

$$X(e^{j\omega T}) = \sum_{m=-\infty}^{\infty} x_1(m)\, e^{-j\omega m T} = \sum_{n=-\infty}^{\infty} x(n) \sum_{k=0}^{L-1} e^{-j\omega k T}\, e^{-j\omega n T} =$$

$$= \sum_{n=-\infty}^{\infty} x(n) \frac{1 - e^{-j\omega L T}}{1 - e^{-j\omega T}}\, e^{-j\omega n T} =$$

$$= \sum_{n=-\infty}^{\infty} x(n)\, e^{-j\omega(L-1)T/2} \frac{sin(\omega L T/2)}{sin(\omega T/2)}\, e^{-j\omega n T}$$

Hence, the spectrum is weighted with a $\frac{sin(Lx)}{sin(x)}$ function that attenuates the unwanted images of the baseband, but it effects also the passband of interest. Compare this case with a zero-order-hold D/A converter. However, the attenuation is small and the computations must be done at the higher sample rate. Thus, the computational workload is much higher.