

**Table 4.2.1. The four cases of linear phase FIR filters. The real-valued frequency response. Summary.**

$M$ : even /odd	Symmetry of impulse response	$H_r(\omega) \in R$	$H_r(0)$
Even	Symmetrical	$H_r(\omega) = 2 \sum_{k=0}^{\frac{M-1}{2}} h(k) \cos \omega \left( \frac{M-1}{2} - k \right)$	$H_r(0) = 2 \sum_{k=0}^{\frac{M-1}{2}} h(k)$
Odd	Symmetrical	$H_r(\omega) = h \left( \frac{M-1}{2} \right) + 2 \sum_{k=0}^{\frac{M-3}{2}} h(k) \cos \omega \left( \frac{M-1}{2} - k \right)$	$H_r(\omega) = h \left( \frac{M-1}{2} \right) + 2 \sum_{k=0}^{\frac{M-3}{2}} h(k)$
Even	Antisymmetrical	$H_r(\omega) = 2 \sum_{k=0}^{\frac{M-1}{2}} h(k) \sin \omega \left( \frac{M-1}{2} - k \right)$	$H_r(0) = 0$
Odd	Antisymmetrical	$H_r(\omega) = 2 \sum_{k=0}^{\frac{M-3}{2}} h(k) \sin \omega \left( \frac{M-1}{2} - k \right)$	$H_r(0) = 0$