reconstruction filter, $h(r)$, with the window function , $W(z)$, for differential phase contrast

$$h(r) = \frac{i}{2\cdot\pi}\cdot\left(\int_{-\infty}^{0} W(z)\cdot\exp(2\cdot\pi\cdot i\cdot r\cdot z)\,dz - \int_{0}^{\infty} W(z)\cdot\exp(2\cdot\pi\cdot i\cdot r\cdot z)\,dz\right)$$

$$= \frac{1}{\pi}\cdot\int_{0}^{\infty} W(z)\cdot\sin(2\cdot\pi\cdot r\cdot z)\,dz \qquad \text{when } W(z) \text{ is the even function of } z$$

band pass Ramachandran filter , $h_R(r)$, for differential phase contrast

$$W(z) = \begin{cases} 1 & 0 \le z_1 \le |z| \le z_2 \le z_N \\ 0 & \text{others} \end{cases}$$

$$h_R(r) = \frac{1}{\pi}\cdot\int_{z_1}^{z_2} \sin(2\cdot\pi\cdot r\cdot z)\,dz$$

$$= \begin{cases} 0 & r = 0 \\ -\dfrac{1}{\pi}\cdot[\,I(2\cdot\pi\cdot r, z)\,]_{z_1}^{z_2} & \text{others} \end{cases}$$

band pass Shepp filter , $h_S(r)$, for differential phase contrast

$$W(z) = \begin{cases} \sin\left(\dfrac{\pi}{2}\cdot\dfrac{z}{z_N}\right)/\left(\dfrac{\pi}{2}\cdot\dfrac{z}{z_N}\right) & 0 \le z_1 \le |z| \le z_2 \le z_N \\ 0 & \text{others} \end{cases}$$

$$h_S(r) = \frac{2\cdot z_N}{\pi^2}\cdot\int_{z_1}^{z_2} \frac{1}{z}\cdot\sin\left(\frac{\pi}{2}\cdot\frac{z}{z_N}\right)\cdot\sin(2\cdot\pi\cdot r\cdot z)\,dz$$

$$= -\frac{1}{2\cdot\pi}\cdot\frac{1}{\Pi}\cdot[\,\mathrm{Ci}(|2\cdot\pi\cdot r+\Pi|\cdot z) - \mathrm{Ci}(|2\cdot\pi\cdot r-\Pi|\cdot z)\,]_{z_1}^{z_2} \qquad \text{when } r \ne \pm\tfrac{1}{2}\cdot\frac{\Pi}{\pi}$$

band pass Chesler filter , $h_C(r)$, for differential phase contrast

$$W(z) = \begin{cases} \tfrac{1}{2}\cdot\left(1+\cos\left(\pi\cdot\dfrac{z}{z_N}\right)\right) & 0 \le z_1 \le |z| \le z_2 \le z_N \\ 0 & \text{others} \end{cases}$$

$$h_C(r) = \frac{1}{2\cdot\pi}\cdot\int_{z_1}^{z_2}\left(1+\cos\left(\pi\cdot\frac{z}{z_N}\right)\right)\cdot\sin(2\cdot\pi\cdot r\cdot z)\,dz$$

$$= \begin{cases} 0 & r = 0 \\ \mp\dfrac{1}{2\cdot\pi}\cdot[\,I(2\cdot\Pi, z) + \tfrac{1}{2}\cdot I(4\cdot\Pi, z)\,]_{z_1}^{z_2} & r = \pm\dfrac{\Pi}{\pi} \\ -\dfrac{1}{2\cdot\pi}\cdot[\,I(2\cdot\pi\cdot r, z) + \tfrac{1}{2}\cdot(I(2\cdot(\pi\cdot r+\Pi), z) + I(2\cdot(\pi\cdot r-\Pi), z))\,]_{z_1}^{z_2} & \text{others} \end{cases}$$

where

z_N : Nyquist frequency ($z_N = \tfrac{1}{2}$ when r is the integer)

$\Pi = \dfrac{\pi}{2\cdot z_N}$ ($\Pi = \pi$ when r is the integer)

$I(t, z) = \dfrac{\cos(t\cdot z)}{t}$

$\mathrm{Ci}(x) = -\displaystyle\int_{x}^{\infty}\frac{\cos(y)}{y}\,dy$: cosine integral