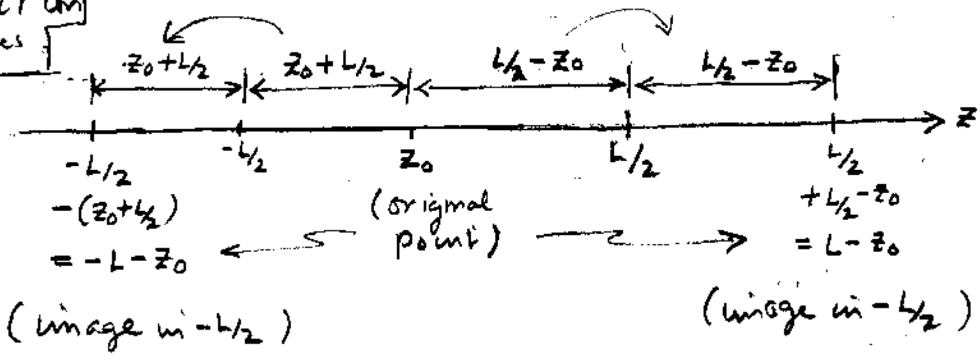
Construction of images



Starting with a source at $z_0 = z^*$ one must put sinks at mirror images $z_{\pm 1} = \pm L - z_0$ in $z = \pm L/2$ to cancel source there.
The sink at z_{+1} must however be cancelled on $-L/2$ by a source at $-L - z_{+1} = -2L + z_0$, and that at z_{-1}, on $+L/2$, by one at $+L - z_{-1} = 2L + z_0$, etc.; Thus,

$$G(z,t;z^*,t^*) = G_\infty(z,t;z^*,t^*) + \sum_{k=1}^{\infty} (-1)^k \Big[G_\infty(z,t;kL-(-1)^k z^*,t^*) + G_\infty(z,t;-kL-(-1)^k z^*,t^*) \Big]$$

Or

$$G(z,t;z^*,t^*) = g(z-z^*, t-t^*) + \sum_{k=1}^{\infty} (-1)^k \Big[g(z-kL+(-1)^k z^*, t-t^*)$$

$$+ g(z+kL+(-1)^k z^*, t-t^*)$$

where $g(z,t) = G_\infty(z,t;0,0)$ is even in z.

Then,

$$\begin{aligned} G(L/2,t;z^*,t^*) = \; & g(\tfrac{L}{2}-z^*, t-t^*) \\ & - g(\tfrac{L}{2}-z^*, t-t^*) && (k=1) \\ & - g(\tfrac{3L}{2}-z^*, t-t^*) && (\;\text{''}\;) \\ & + g(-\tfrac{3}{2}L+z^*, t-t^*) && (k=2) \\ & + \ldots \quad (\text{etc.}) \end{aligned}$$

with a similar result for $z = -L/2$, so that G vanishes on $z = \pm L/2$ and has a solitary singular point, at $z = z^*$, in $(-L/2, L/2)$.