

Bessel Series of $f(r) = 1 - r$ for $r \in (0, 1)$

$$f(r) = \sum_{n=0}^{\infty} c_n J_0(\alpha_n r)$$

where

$$c_n = \frac{\int_0^1 f(r) J_0(\alpha_n r) r \, dr}{\int_0^1 [J_0(\alpha_n r)]^2 r \, dr}$$

In particular, for $f(r) = 1 - r$ use tables to find $c_0 \simeq 0.7841$, $c_1 \simeq 0.0691$, $c_2 \simeq 0.0543$.

