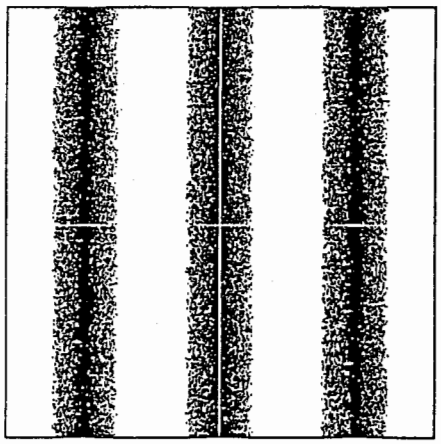
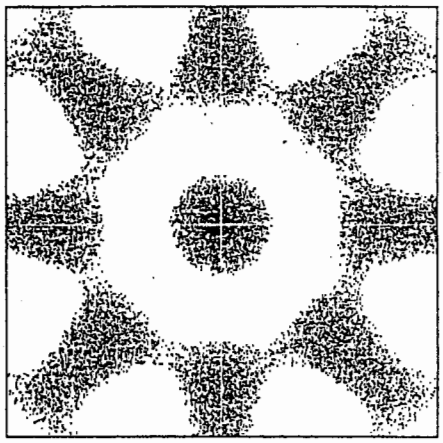
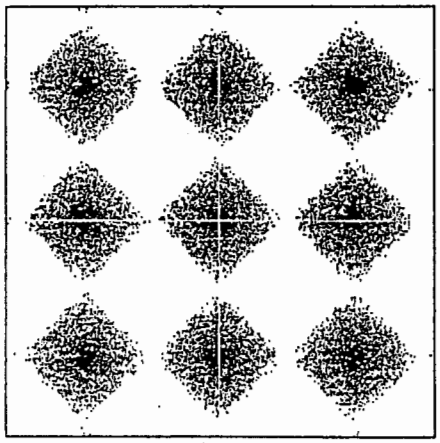
Toward $J_o(r)$



1



4



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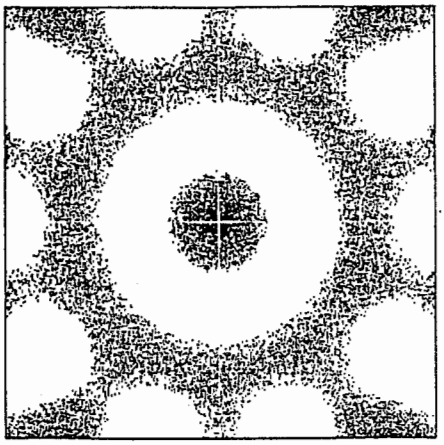
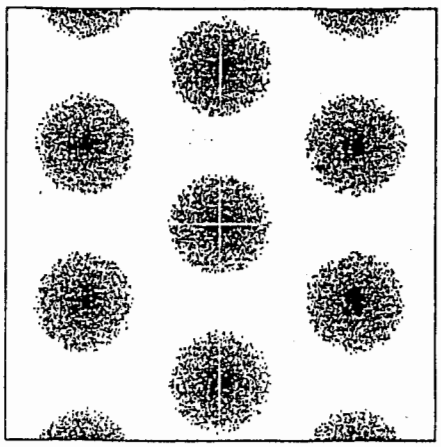


5



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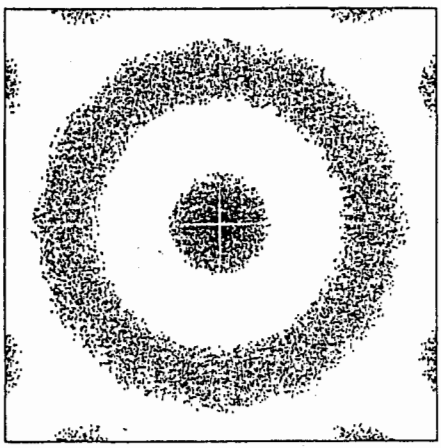


6

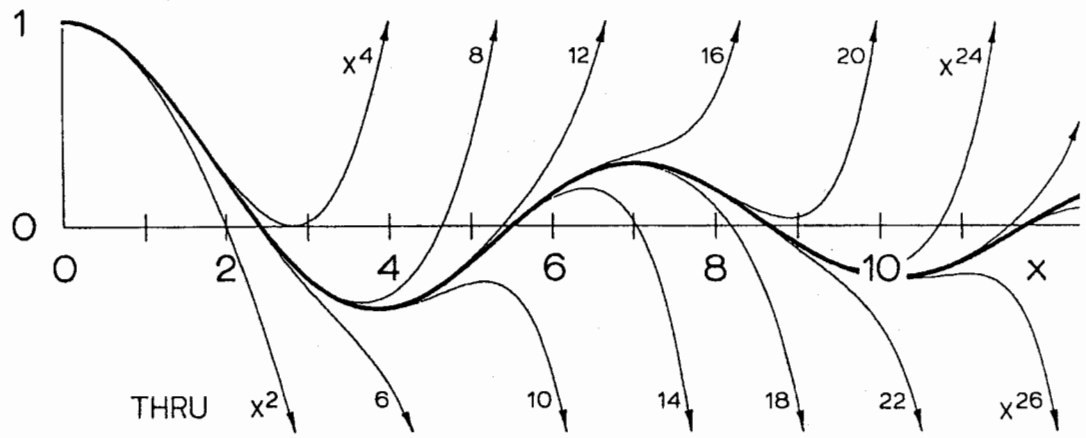
BESSEL FUNCTION $J_0(x)$

1. Obeys the equation $\boxed{y'' + \frac{1}{x}y' + y = 0}$ with $y(0) = 1$, $y'(0) = 0$

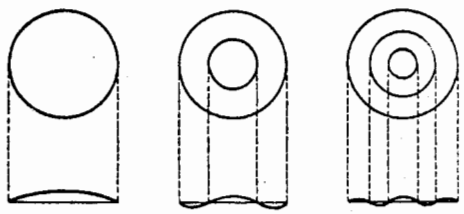
2. Is described by the series

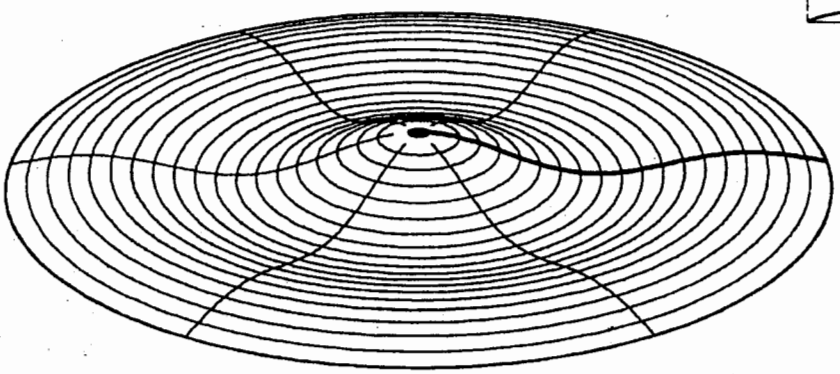
$$J_0(x) = 1 - \frac{x^2}{2\cdot 2} + \frac{x^4}{2\cdot 2\cdot 4\cdot 4} - \frac{x^6}{2\cdot 2\cdot 4\cdot 4\cdot 6\cdot 6} + \ldots$$

3. Looks like so ... once that series has settled down:



4. Has zeroes $x_1 = 2.405$, $x_2 = 5.520$, $x_3 = 8.654$, ...
and many uses, including:





A.T.