



7.  $x^2 y'''' + 6xy''' + 6y'' - a^2 y = 0.$

*Equation of transverse vibrations of a pointed bar.*

Solution:

$$y = \frac{1}{\sqrt{x}} [C_1 J_1(2\sqrt{ax}) + C_2 Y_1(2\sqrt{ax}) + C_3 I_1(2\sqrt{ax}) + C_4 K_1(2\sqrt{ax})],$$

where  $J_1(z)$  and  $Y_1(z)$  are the Bessel functions, and  $I_1(z)$  and  $K_1(z)$  are the modified Bessel functions.

### References

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