A generalized Sommerfeld expansion for thermopower calculation
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— Kelvin formula relates the thermopower to the temperature derivative of the
chemical potential. The latter can be evaluated using the Sommerfeld expansion as
a standard approximation at low temperatures. We present a generalized expansion
with improved accuracy at intermediate and high temperatures. We apply the for-
mula to sodium cobaltate Na$_x$CoO$_2$ and other thermoelectric materials to verify its
validity over a wide temperature range.