

Reading: Chapter 12 section 6 (you may find Chapter 3 sections 10 and 14 to be useful background) and sections 11, 21 for comments and examples of the Frobenius variation of the series method

- (1) In our solution of Schrödinger's equation for the harmonic oscillator we saw that the ratio of the  $b_n$ 's scaled as

$$\frac{b_{n+2}}{b_n} \simeq \frac{2}{n}$$

for large  $n$ . I claimed that this behavior was the same as for  $e^{-x^2}$ . Show this by expanding the exponential in powers of  $x^n$  and demonstrating that the coefficients in this series have the same behavior as the  $b_n$ 's above.

- (2) Use the series method to obtain a solution of the differential equation

$$(1 - x^2)u'' - 2xu' + 6u = 0$$