1. Classify the PDE as either parabolic, hyperbolic or elliptic:

\[ u_{xx} + u_{xy} - u_{yy} + 4u_x + 2u_y + 5 = 0. \]

2. Dawson’s Integral

\[ e^{-x^2} \int_0^x e^{t^2} dt, \]

is of importance in diffusion physics. The important issue is the behaviour of the integral as \( x \to \infty \); does it tend to zero, infinity or a finite value? Using the elementary determine the two first terms of an asymptotic expansion. You may need to fiddle to put the integral in a useful form.

3. Determine the first two terms of the asymptotic expansion (large \( x \)) for the solution of

\[ w'' - w(1 - 1/x^2) = 0, \quad x > 0 \]

that is bounded at infinity.