Consider the following initial value problem:

\[ y'' - 2y' + 2y = 0, \quad y(0) = 1, \quad y'(0) = 0. \]

1. Solve the initial value problem by using the characteristic equation for this second-order equation.
2. Solve the initial value problem with Laplace transforms.
3. Use series methods to compute terms up to and including \( t^4 \) for the solution to the initial value problem.
4. Convert the initial value problem to a system of two first-order equations. Find the solution to this system by computing eigenvalues and eigenvectors.

Note: You will only be given credit for each of the above problems if you show each step of the solution process.