Problem 8

In each of Problems 5 through 8, determine a lower bound for the radius of convergence of series solutions about each given point $x_0$ for the given differential equation.

$$xy'' + y = 0; \quad x_0 = 1$$

Solution

The coefficient of $y''$ is $x$. Its zero is located at $x = 0$. Plot it in the complex plane and expand a circle centered at $x_0$ as much as possible until it intersects $x = 0$.

If $x_0 = 1$, the lower bound for the radius of convergence is 1.

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