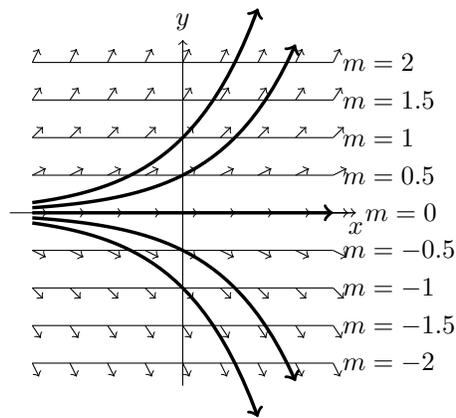


Isoclines

Exercise. What are the isoclines for $y' = y$? Make a large diagram, and draw the isoclines for $m = -2, -1, 0, 1, 2$; use these to sketch the direction field. Draw some integral curves; how many different types of behaviors do there seem to be?

Answer.



The isoclines are horizontal lines $y = m$. We can see in the figure three types of behavior for the integral curves. We know by solving the DE that they are given by $y(x) = Ce^x$, and these types are classified by the sign of C : positive, zero, or negative.

Remark. As the slope field is invariant under horizontal translation, integral curves are horizontal translations of each other. This will be discussed in much greater detail in the session on autonomous equations.

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18.03SC Differential Equations
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