R Scripting

Lab for units 5 and 6 - Functions, Object-oriented concepts, graphics

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Please solve the following problems!

1. Write a function that can be used to plot the so-called *Lissajous curves* that are defined as follows:

$$z(x) = \begin{pmatrix} sin(ax) \\ sin(bx) \end{pmatrix}$$

You can see some examplary Lissajous curves below.

a) You can graph the figures by plotting z1 vs. z2 (= x- and y-coordinates) and connecting the points for $x[-\pi, \pi]$. The plot should also contain a title that shows the `a`- and `b`-values used for the creation of the given plot. Generate some exemplary curves for various values of `a` and `b`.

- Hint 1: First, you need to create sequence of points `x` between $-\pi$ and π that defines the resolution of the plot - the longer the sequence, the higher the resolution.
- Hint 2: Use the two expressions given above to compute `z1` and `z2`, given sequence `x` created before.

b) Now, we want to give users the possibility to select the graphics system that produces the plot, i.e., that a plot is either generated using the base graphics system or `lattice`. In addition, it should also be possible to change the resolution using a function argument. Fix your function accordingly! Generate some exemplary curves for various settings again!