Homework 2a: **Green's Function Primer**

Course: Physics 231, *Methods of Theoretical Physics* (2018)
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1 A proto-Green's Function

Suppose that you need to find the vector $\mathbf{x}$, an element of $\mathbb{R}^3$, given a relation

$$A\mathbf{x} = \mathbf{y}_0 \ , \tag{1.1}$$

where $\mathbf{y}_0$ is known, but A is not known. Instead, you are given the following information about the action of the inverse transform on a particular basis:

$$A^{-1}\,|1\rangle = c\,|1\rangle - s\,|2\rangle \qquad A^{-1}\,|2\rangle = s\,|2\rangle + c\,|1\rangle \qquad A^{-1}\,|3\rangle = |3\rangle \ . \tag{1.2}$$

If $\mathbf{y}_0 = \sum y^i\,|i\rangle$ and you know the components (y^1, y^2, y^3) in this basis, what are the components of $\mathbf{x}$, (x^1, x^2, x^3), in this basis?