Creating Uniformly Spaced Vectors
(Colon Operator)

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Structural Dynamics

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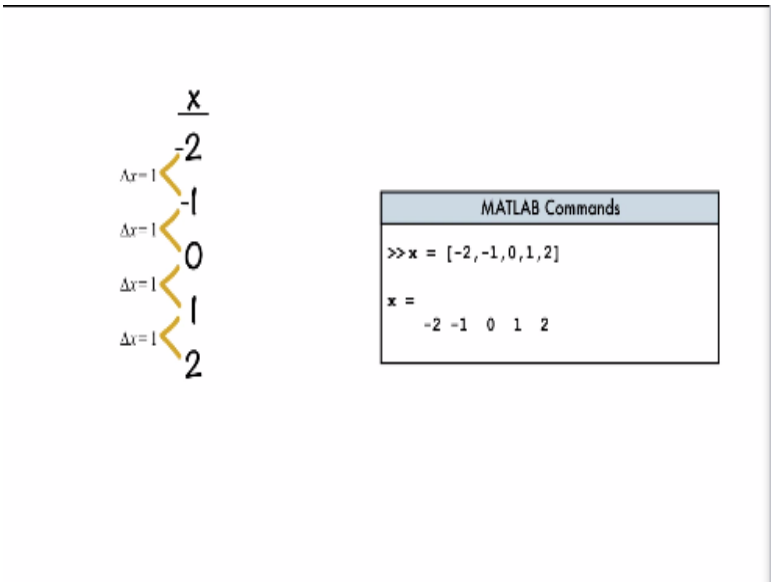

Creating lists of regularly spaced numbers is very common we know how to create vectors by entering numbers.

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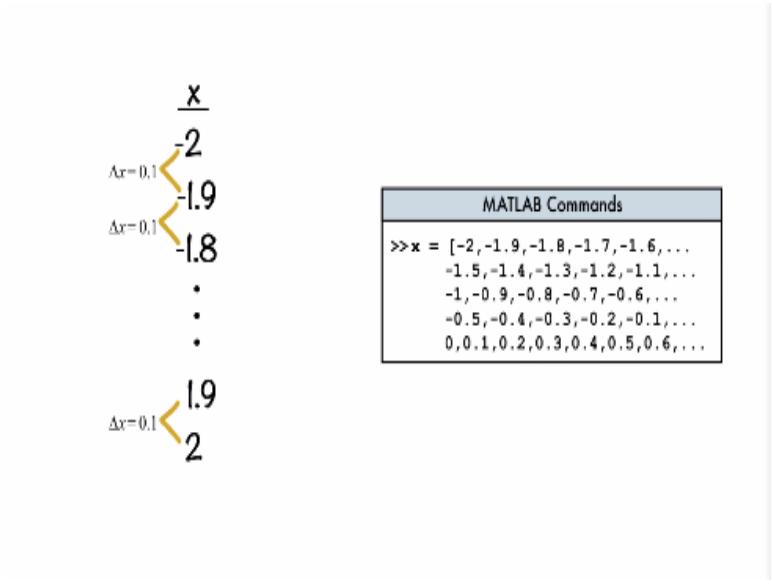

But what if we want to make the spacing 0.1 instead of one our vector grows from five numbers to 41 numbers and who wants to type in 41 numbers.

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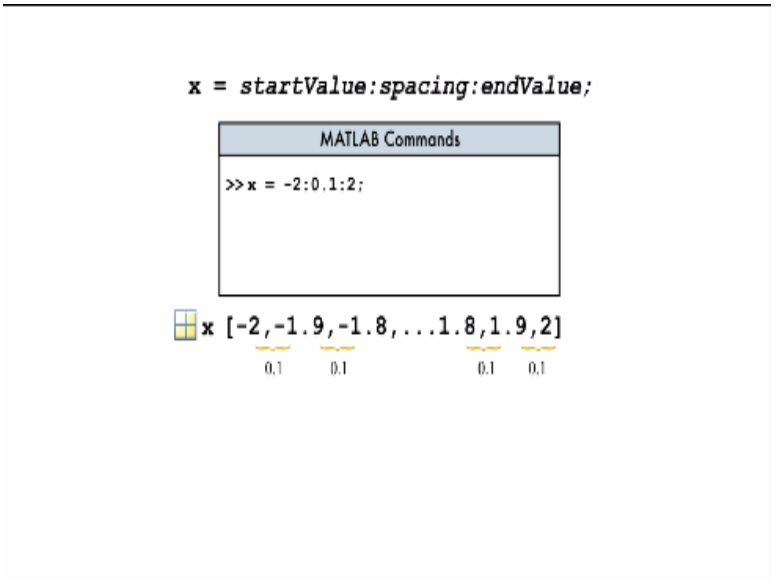

Fortunately there is a better way we can create the same vector with just three numbers the start value, the spacing and the end value. Let us take a look at this example we begin with a starting value negative 2, the spacing is 0.1, and the end value is 2 we separate the numbers with colons and there we have it a row vector from negative 2 to 2 in steps of 0.1.

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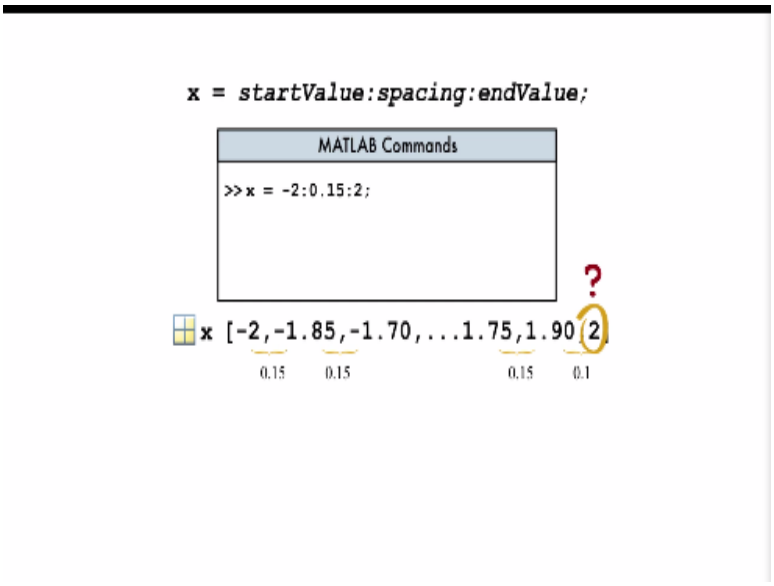

But what if we chose a different spacing like 0.15 with the vectors still end at 2.

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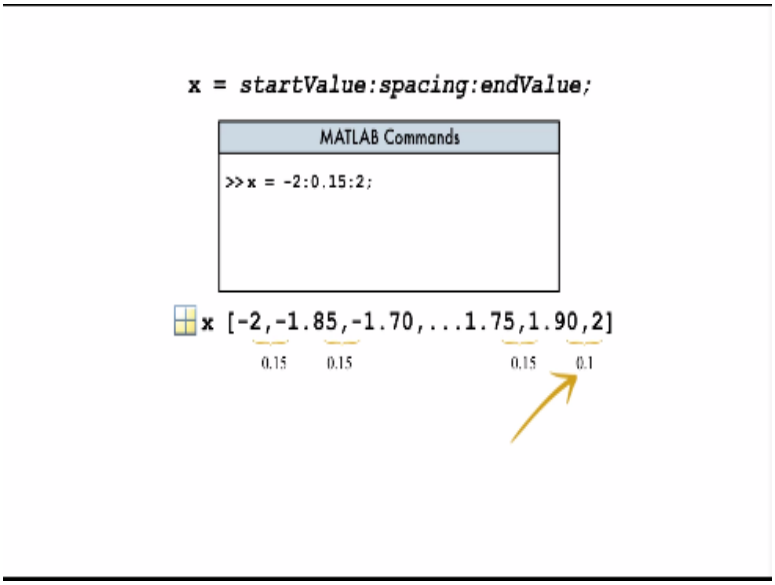

This would require the wrong spacing for the final value. So what happens, in this case the vector ends with the value 1.9.

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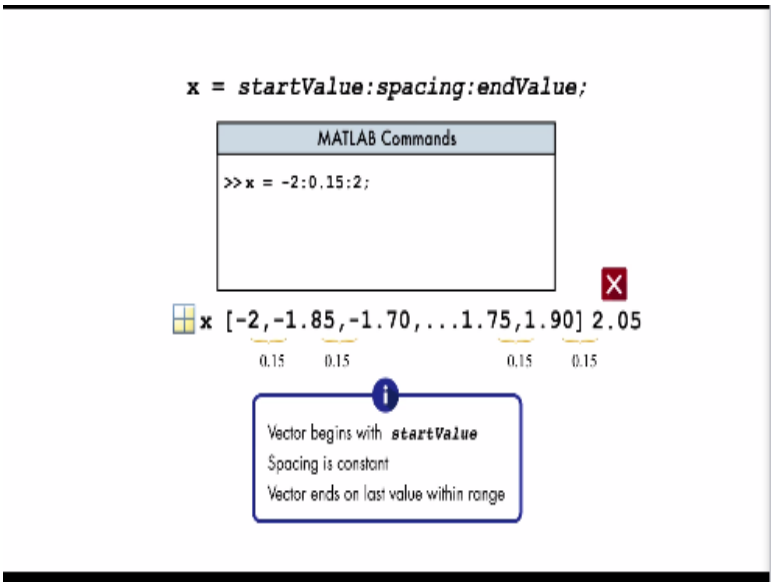

When using the colon operator the defined starting value is included and the vector will contain equally spaced numbers up to and possibly including the end value, but not beyond. Since 1.9+0.15 is greater than 2.

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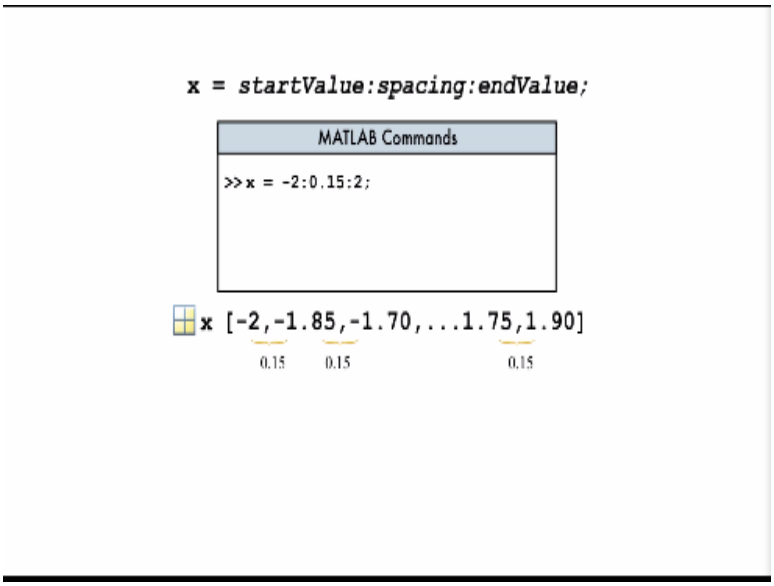

The last value in this vector is 1.9.

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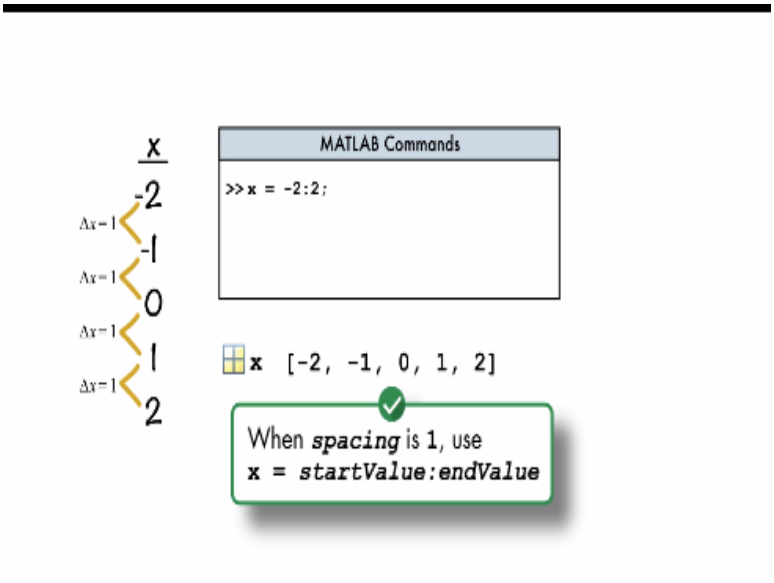

Remember that vector where the spacing was 1, a spacing of 1 is so common there is a shortcut for it. We define only the start and end values separated by a colon to create the vector. A spacing of 1 is assumed.

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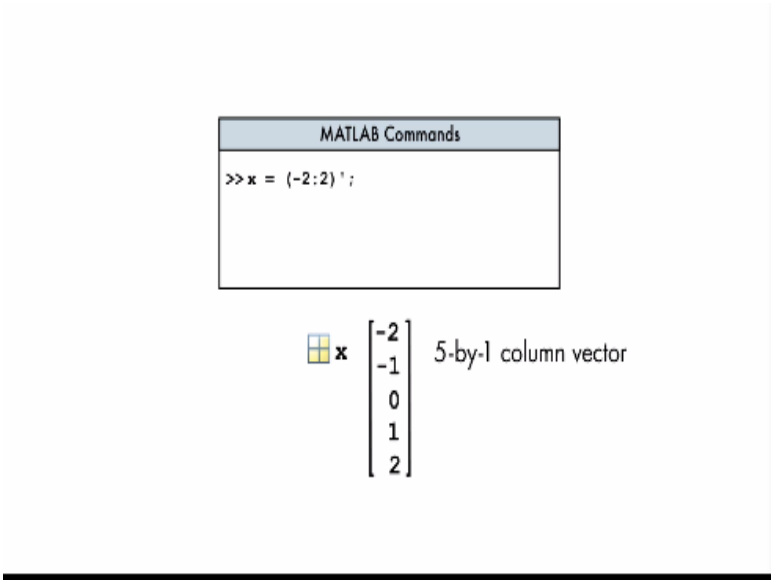

Now there is one last thing to be aware of, perhaps you have already noticed that X is a row vector what if our application calls for a column vector no problem two small changes will fix this. We add parentheses to group the code creating the vector and use an apostrophe to transpose the row vector into a column vector.

The apostrophe is the transpose operator and converts row vectors to column vectors and vice versa. It also works on matrices go to MATLAB and create a few vectors yourself, try changing the spacing and see when the vector includes the end value.

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