From Floating Point Arithmetic to Integer Arithmetic

- Simulink models allow double, but NXC allows only integer and float

- In NXC, speeds can be specified using the percentage of the maximal

- Without proper conversion, rounding error can be serious

- Example: with a program that works only on integer numbers, if we multiply 27.6 by 3.12, we get 84 and not 86 (because 27.6 is rounded to 28 and 3.12 is rounded to 3)

- A solution: Using scale factors

Using Scale Factors

- Multiplying the numbers and then scaling down to get the true results.

- Often, scaling down is done last. If it is done too soon, we may lose some precision.

- **Some rules**:

    1. When adding and substracting, both number must have the same scale factor. Their sum or difference will have that same scale factor

    2. When multiplying/dividing, the numbers need not have the same scale factor. The scale factor of the product/quotient is the product/quotient of the scale factors of the original numbers.

- Attention: overflow may occur! Check the range of integers and floats in NXC