Subject: Alternative method for updating complex parts
From: Van Snyder
Reference: 04-384r1, 05-128, WG5/N1626-J3-015, 05-200r1
Depends upon: 05-261

1   Requirement

Provide a mechanism to update the real or imaginary part of a complex variable, or associate it as an actual argument, independently of the other part.

2   Detailed specification

Using the classification of types along two axes (intrinsic vs. program defined, and elementary vs. derived), and the provision for the existence of intrinsic derived types, both established in 05-261, specify that COMPLEX is an intrinsic sequence derived type with one kind type parameter named KIND and two real components of that kind named RE and IM. It's not a numeric sequence derived type because numeric sequence derived types can't have parameters. The only reason for it to be a sequence type is to require that the real component comes first in storage. Everything else that one might want to do with SEQUENCE is already specified for COMPLEX, and works subtly differently from the general SEQUENCE case.

2.1   Advantage as compared to approach in 05-200r1

No new syntax and no new concepts (other than those established in 05-261) are needed. There are no questions about subobjects, equivalence using the syntax to specify just one component, contiguity, whole arrays using the syntax to specify just one component, or array sections using the syntax to specify just one component, since these issues are already covered for derived type objects. A constructor named COMPLEX arrives automatically. Namelist input of the real or imaginary part independently of the other arrives automatically.

2.2   Disadvantage as compared to approach in 05-200r1

The approach in 05-200r1 is already nearly finished. This approach requires requires 05-261. Namelist input of the real or imaginary part independently of the other arrives automatically.

3   Syntax

No new syntax, and no changes to existing syntax.

4   Edits

Edits refer to 04-007. Page and line numbers are displayed in the margin. Absent other instructions, a page and line number or line number range implies all of the indicated text is to be replaced by associated text, while a page and line number followed by + (-) indicates that associated text is to be inserted after (before) the indicated line. Remarks are noted in the margin, or appear between [and] in the text.

The **complex type** has values that approximate the mathematical complex numbers. It is an intrinsic   39:9-16
sequence derived type with one kind type parameter named KIND and two components. The default value for the kind type parameter is the same as the kind type parameter value for default real. The first component, named RE, is called the **real part**, and the second component, named IM, is called the **imaginary part**. Both components are of real type and of the kind specified by the KIND parameter value. Each kind type parameter value available to specify an approximation method for data entities of real type shall be available to specify the value of the KIND parameter for entities of complex type. The kind type parameter value of an approximation method is returned by the intrinsic inquiry function KIND (13.7.59).