Test case generation for adequacy of floating-point to fixed-point conversion

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Abstract: Porting an application written for personal computer to embedded devices requires conversion of floating-point numbers and operations into fixed-point ones. Testing the conversion hence requires the latter be as close as possible to the former. The closeness is orthogonal to code coverage and requires different strategies to generate a test suite that reveals the gap between the two functions. We introduce a new test adequacy criterion and propose several metrics to quantify the closeness of two functions. After that we propose a method to generate a better test suite from a given one for the test adequacy criteria. We also show experimental results on some well-known mathematical functions. © 2010 Elsevier B.V.

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