

Re: Distance in Denotational Semantics?

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- *From:* sasha <REMOVEIThleba@xxxxxxxxxxxxxxxxxxxxxxxxxxxx>
 - *Date:* Fri, 19 Aug 2005 17:27:12 +0200
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nobrow@xxxxxxxx wrote:

- > Is there a notion of distance in denotational semeantics? I have made
- > cursory readings on the subject in the past, and all the talk of
- > lattices and CPOs made me wonder if it was possible to define a
- > semantic distance between two arbitrary programs ... with the intention
- > of using a distance d to define a region of similarity for a given
- > program P (you know, P is considered similar to Q if $|P Q| < d$). Its a
- > very vague question I know, but your feedback would be appreciated.
- >
- > Thanks.
- >
- > PS If theres a better place to post general question about den. sem.
- > then please tell me.
- >

If you want to argue about the behaviour abstractly, then you have to compare the functions

$f: \omega \rightarrow \omega \cup \{\text{divergence}\}$

$g: \omega \rightarrow \omega \cup \{\text{divergence}\}$

as sets of pairs (or simply as two sequences indexed by ω) by some distance on the set of functions. Here, P computes f and Q computes g .

If you want to argue about the textual form of the programs, construct some distance function on finite texts modulo whitespace, variable renaming, procedure calls, whiles (e.g transform everything to program with gotos and ifs only. or to lambda-calculus and compare P them as graphs in de-bruin form).

If you want to argue about transition systems, construct the process X which branches nondeterministically to the P' =bisimulation quotient of P and Q' =bisimulation quotient of Q and compute the bisimulation quotient X' of X . You can consider states with different variable valuations as different, for example. Then work with something like $(2|X'| - |X|) / |X|$.

Everyhting IMHO.

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- *References:*

Re: Distance in Denotational Semantics?

◆ *Distance in Denotational Semantics?*

◇ *From:* nobrow

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