Reliable Evaluation of the L_2-Norm of a Stable Linear Filter Using Interval Constraints Solving Techniques

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Nowadays, digital signals (DS) are everywhere, from the music we listen to on our portable devices, to communication between security agencies. All of these are made possible thanks to Digital Signals [1]. Occasionally, DS are not clear enough and some information might be lost. We all have experienced this phenomenon while on a phone call for instance, when we cannot hear our interlocutor anymore.

Noise in Digital Signal can be removed or at least minimized using digital filters (W). Such filters satisfy the Lyapunov equation and their L_2-norm is used to estimate how changes in the precision of the input signal can affect the output.

In this talk, we will show how we used Interval Constraint Solving Techniques (ICST) [4, 5, 6] to implement a reliable version of efficient Hammarling's algorithm [2, 3] to solve the Lyapunov equation, obtain the coefficients of the filter, and compute its L_2 norm.

References

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