Current GNSS receivers employ independent tracking loop for each received signal, i.e. every satellite and every frequency. With this receiver design a time consuming reacquisition is needed, whenever a signal is temporarily lost. By formulating the tracking process jointly for all signals, given the involved random processes, such as receiver movements, receiver clock and atmospherical effects, the spatial and spectral correlation of the signals can be exploited. The joint tracking method was tested in an airborne receiver during two stages of flight. In the comparison to a commercial receiver the joint tracking receiver shows its great potential by continuously tracking all signals. This led us to the conclusion that a joint satellite code and carrier tracking receiver makes a GNSS receiver more robust, especially airborne receivers.
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