Carrier phase measurements are extremely accurate but ambiguous. The estimation of the integer ambiguities is in general split in two parts: A least-squares float solution, which is obtained by disregarding the integer property, and the actual fixing. The latter one can be a simple rounding, a sequential fixing (bootstrapping), or an integer least-squares estimation, which typically includes an integer decorrelation and a search. All these fixing methods suffer from a poor accuracy of the float solution due to the small carrier wavelengths. Moreover, the optimal integer least-squares estimation techniques are extremely sensitive to unknown biases. This paper provides a new group of multi-frequency linear combinations to overcome the previous shortcomings: The combinations include both code and carrier phase measurements, and allow an arbitrary scaling of the geometry, an arbitrary scaling of the ionospheric delay, and any preferred wavelength. The maximization of the ambiguity discrimination results in
combinations with a wavelength of several meters and a noise level of a few centimeters. These combinations are recommended for any application where reliability is more important than accuracy. Moreover, the paper provides an efficient method for the computation of the success rate of rounding.