Metered Parking Functions

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In classical parking functions, a car drives to its preferred parking spot on a one-way street with n spots and parks if the spot is unoccupied. Should the desired parking spot be occupied, then the car parks in the next available spot it encounters. If no spot is available, then the car leaves the parking lot. We say that a tuple consisting of the preference of n cars is a parking function if all the cars are able to park. In many major metropolitan areas, finding parking is often paired with having to pay a meter. How would classical parking functions change if a parked car was forced to leave after a set time? In this talk, we introduce a variation of parking functions, which we refer to as metered parking functions. Now after a car has been parked, the car leaves the spot after a set time. We establish a new combinatorial identity for the continued fraction 1/(n-1/(n-1/(...))) (n times) as the number of metered parking spots with exactly a one-hour meter. We also provide some results for metered parking functions for certain counts of cars and times that the cars remain in the spot they parked in.