1163-55-1663   **Gregory Arone***, gregory.arone@math.su.se, and **Alvin Jin**. *Applying calculus of functors to the evasion path problem.* Preliminary report.

The traditional evasion path problem can be formulated mathematically as follows: suppose we have a map (not necessarily a fibration) $p\colon E \to B$. Determine whether p has a section. The problem is non-trivial even in the case when B is an interval.

Traditional obstructions are defined in terms of sheaf cohomology of B. One obvious limitation of the cohomological approach is that it is determined by the fiberwise stable homotopy type of p. There is a specific example, due to Henry Adams, of two spaces over the interval that are fiberwise stable homotopy equivalent, but where one of them has a section and the other one does not. Traditional cohomological methods do not distinguish the two maps.

We use the quadratic approximation to the identity functor to define a "metastable" obstruction to the existence of a section in the case when cohomological obstructions vanish. Our obstruction does distinguish the two map in Adams's example.

In the process of defining the obstruction we give an explicit description of the quadratic stage of the Goodwillie tower of the identity of *unpointed* spaces. This may be of independent interest.

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