

# Homework 6: The Circle

Due 2019/05/01 (Fri) Anywhere on Earth

This homework is to replicate a milestone in homotopy type theory (but in cubical type theory): the loop space of the circle is equivalent to the integers. The theorem demonstrated that the higher inductive types make sense and provided a data point for us to examine type-theoretic and traditional textbook proofs. As you will see, the type-theoretic proof is equally concise compared to the most polished conventional proof.

The core idea is well-explained in [1, Section 8.1]. It is highly recommended to read the exposition before diving into cubical Agda. As usual, please email the completed Agda file to Favonia.

## Grading

Only one letter grade (without plus or minus) will be assigned to the *entire* homework according to the criterion explained in the syllabus. **There are no bonus tasks, but it is highly recommended to study “decode.”**

## References

- [1] The Univalent Foundations Program. *Homotopy Type Theory: Univalent Foundations for Mathematics*. Institute for Advanced Study, 2013. URL: <http://homotopytypetheory.org/book>.