**MS-E2191 Graduate Seminar on Operations Research**

Fall 2020

Homework 11

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Please fill in the missing parts of the proof below.

**Proposition:** **Convergence of the DP Algorithm.** For any bounded function , we have

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**Proof:** For every positive integer , initial state , and optimal policy , we break the cost into portions acquired from the first stages and from the remaining stages

+ .

By assuming that the cost is bounded, , we obtain

= .

Using the relations above it follows that

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By taking the minimum over , we obtain for all and

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By taking the limit , the result follows. **Q.E.D.**