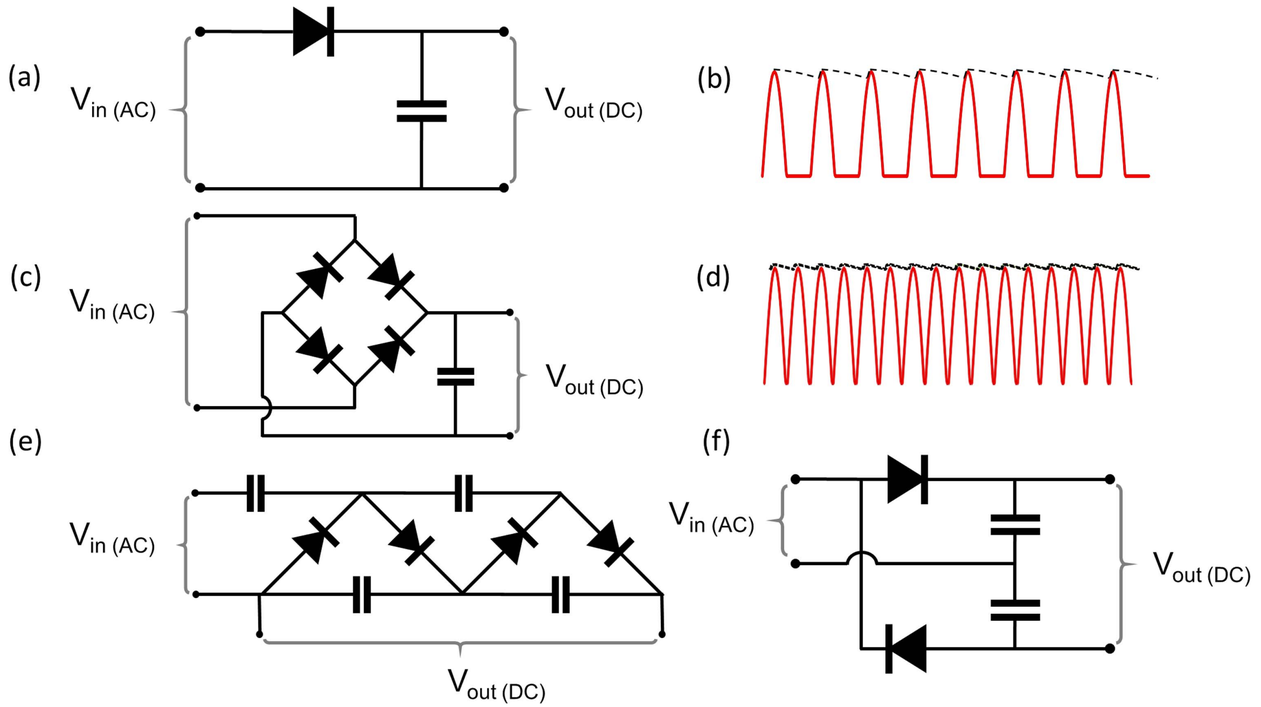
Schottky Diode Applications

AP 4018
Columbia University

Objectives: Schottky Diode Applications

- Schottky diodes are used in all common applications of diodes
- Additionally, Schottky diodes have higher switching speeds than PN diodes because they do not have a reverse voltage “recovery time” associated with charge storage at PN interfaces.
- For this part of the lab:

  Use a Schottky Diode in a circuit



Good reference

OPEN ACCESS
IOP Publishing
Semiconductor Science and Technology
Semicond. Sci. Technol. **32** (2017) 123002 (45pp)
https://doi.org/10.1088/1361-6641/aa89ce

Topical Review

Flexible diodes for radio frequency (RF) electronics: a materials perspective

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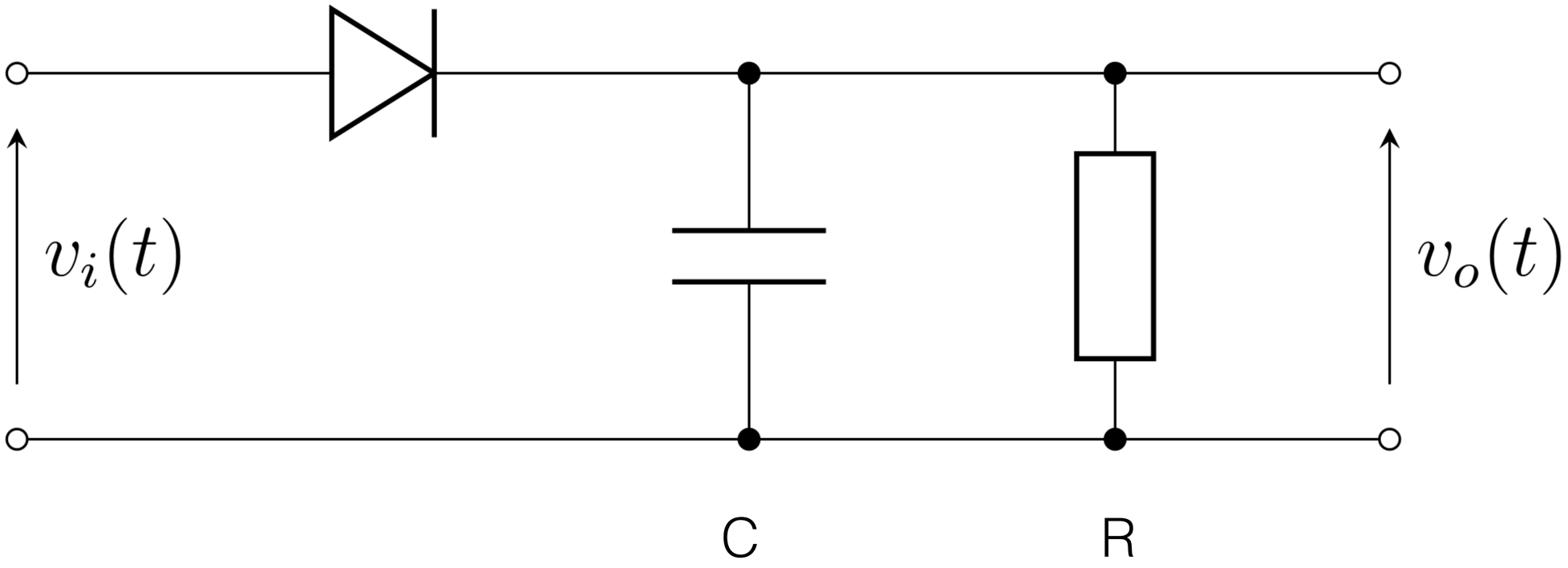
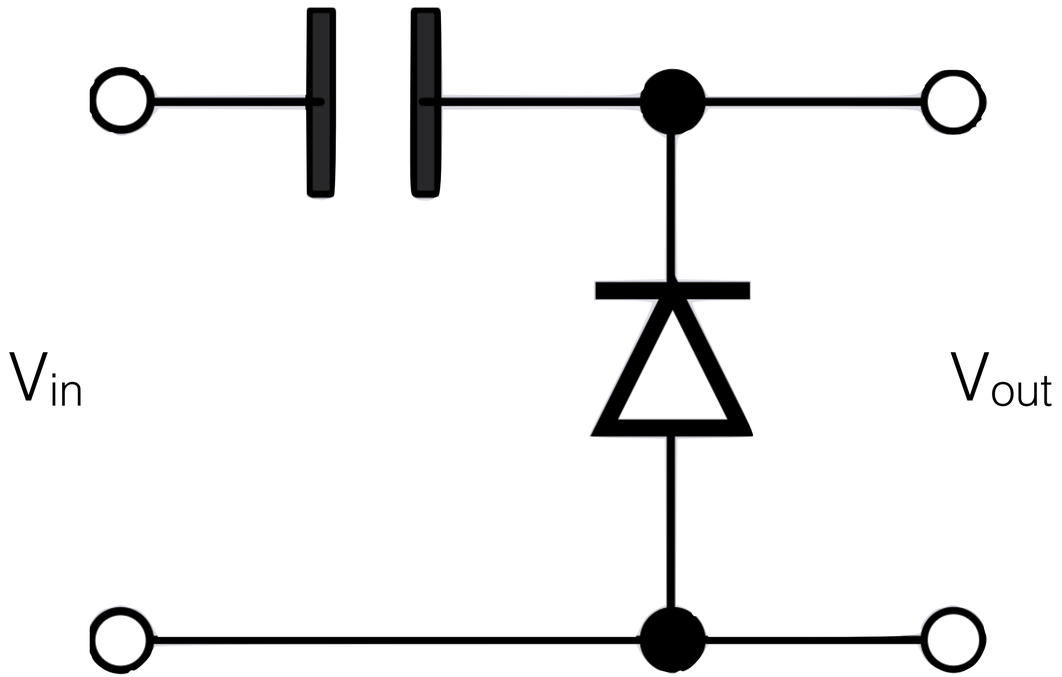
Possible Circuits

- Half-wave rectifier
- Voltage doubling (“Villard Circuit”)
- Improved voltage doubling (“Greinacher Circuit”)
- Delon voltage doubling (i.e. a diode “bridge”)
- Full-wave bridge rectifier
- Voltage quadrupler, or “charge pump”
- Also: diode logic (Or and And gates)

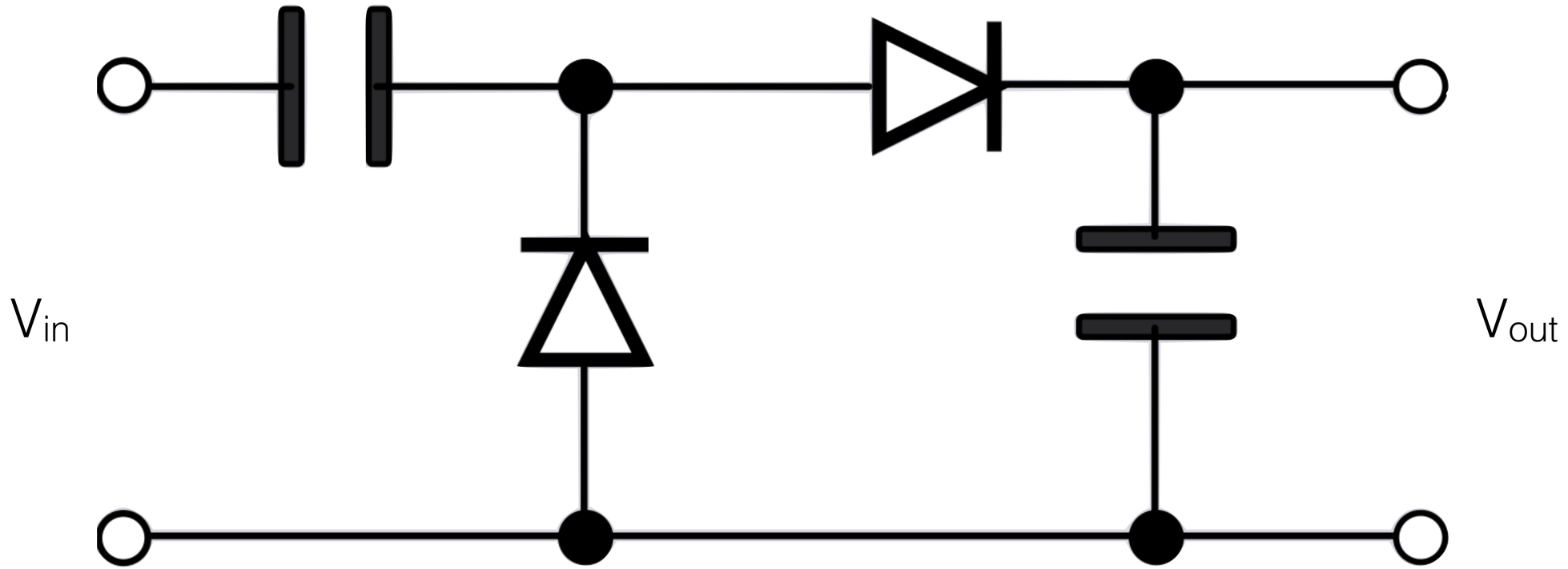
Half-Wave Rectifier



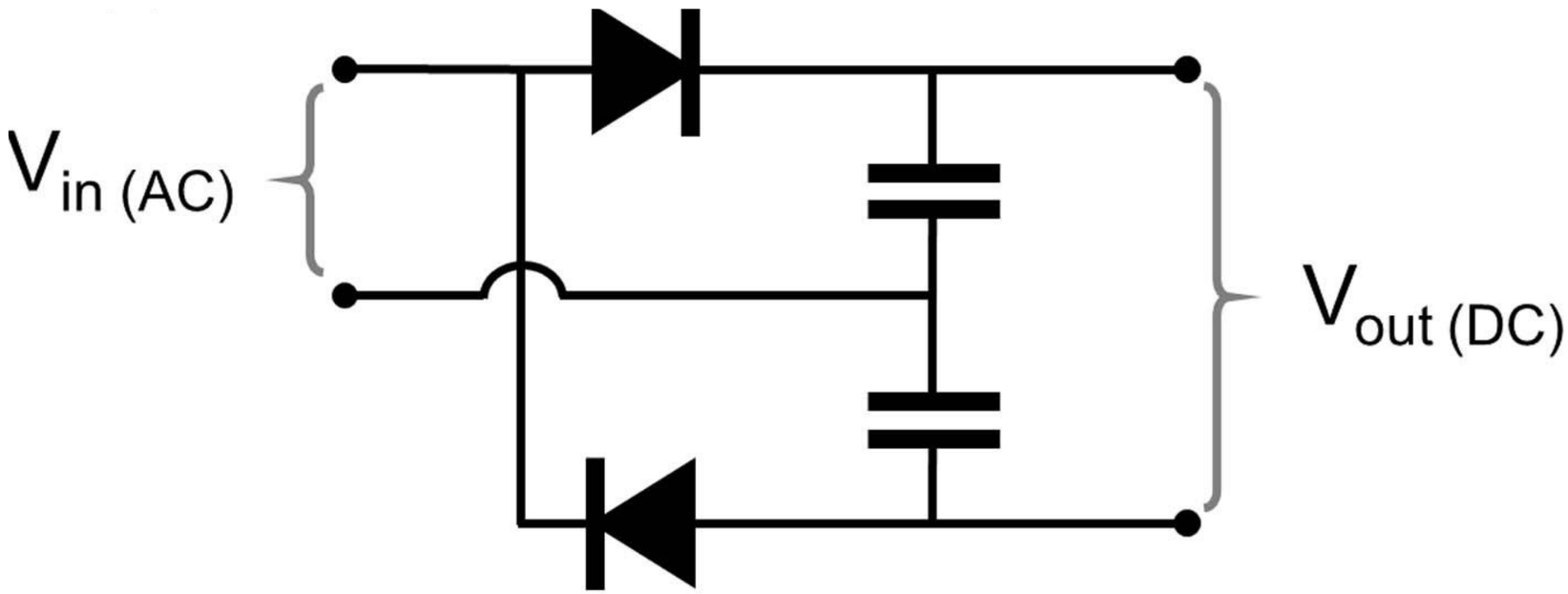
Voltage Doubling



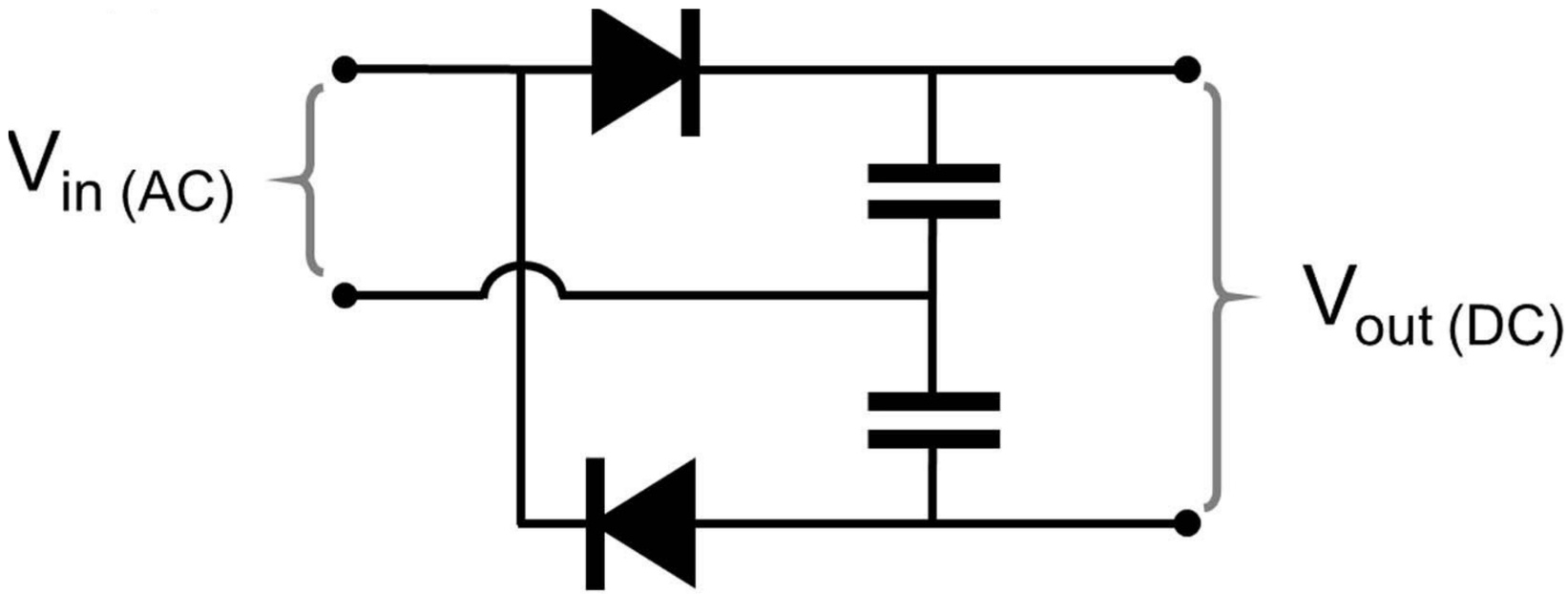
Improved Voltage Doubling



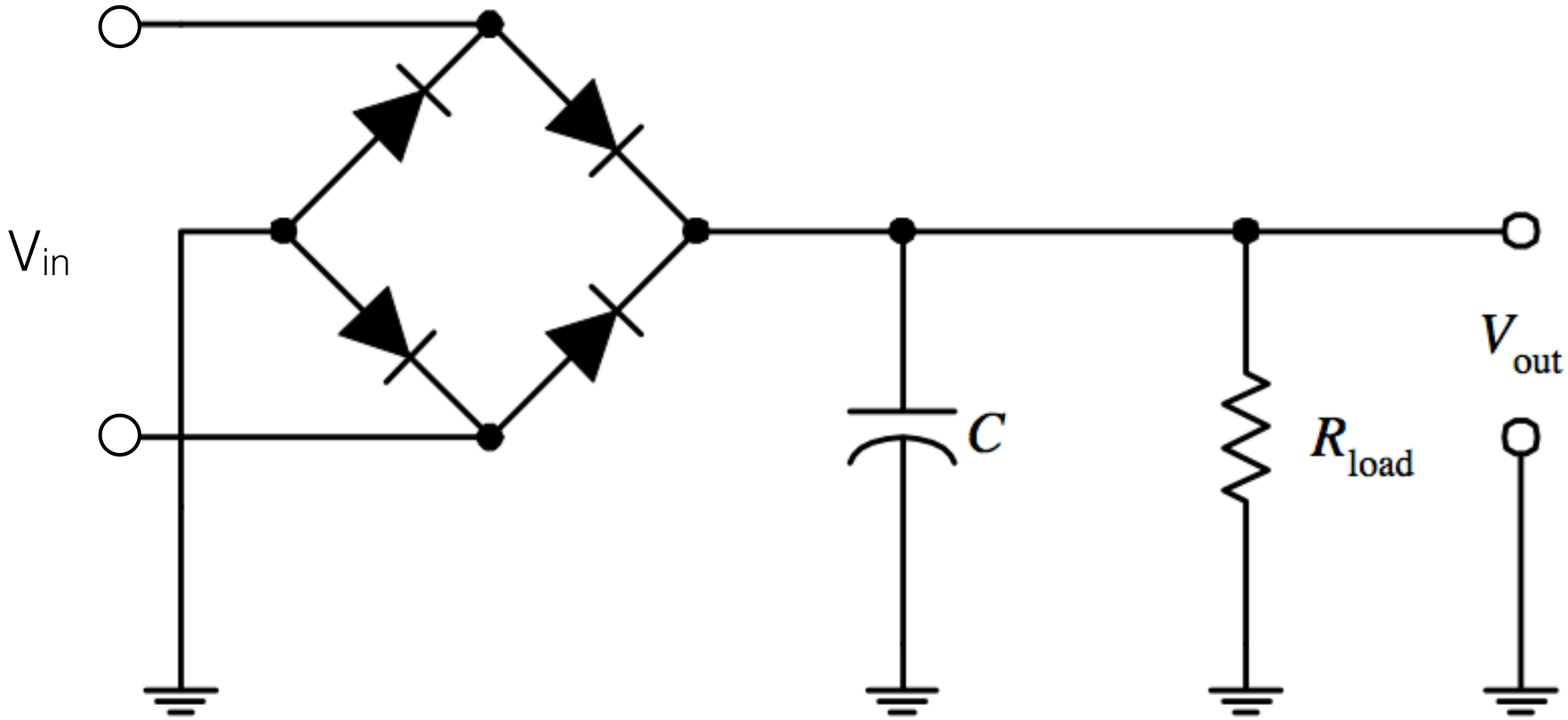
Double Half-Wave Rectifier (Delon Voltage Doubler)



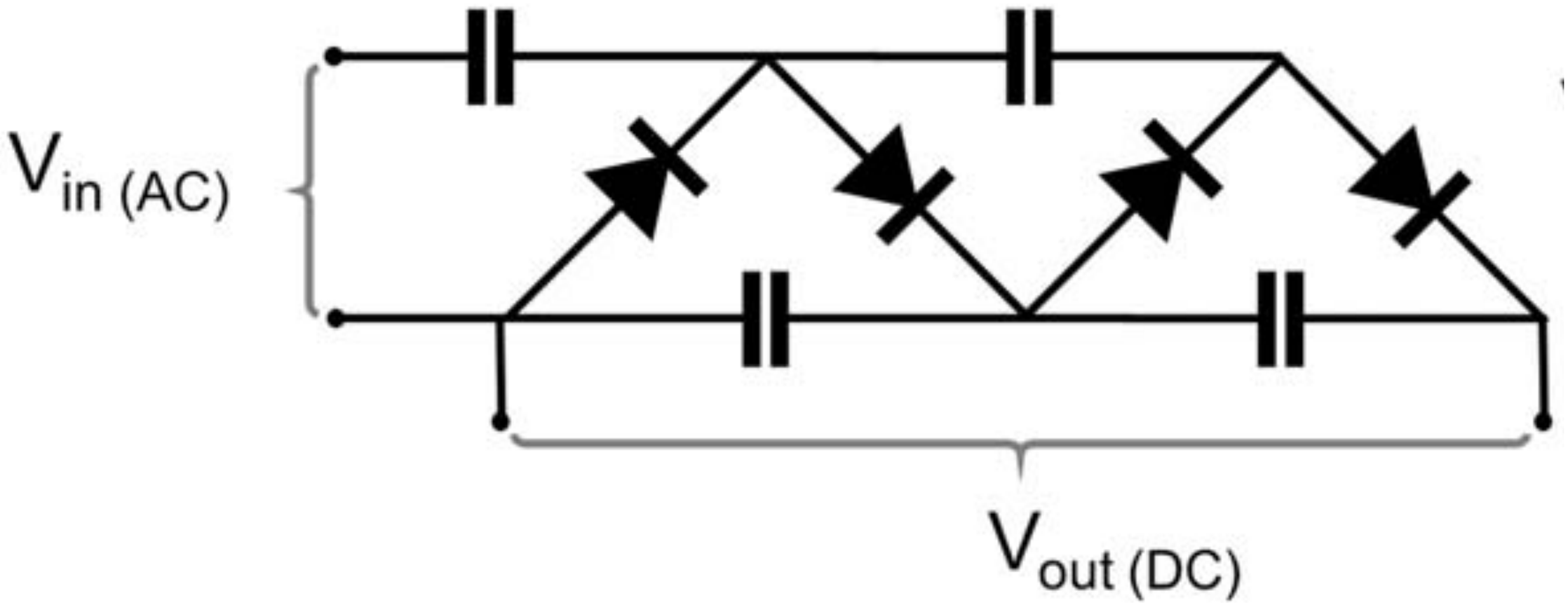
Double Half-Wave Rectifier (Delon Voltage Doubler)



Full-Wave Bridge Rectifier



Charge Pump



Summary

- Make, test, and characterize one, or more, diode circuits