

**Paper #2. Due Weds Nov 30.**

Instructions:

- (a) Choose one of the following topics and respond to it in an essay of no less than 5 pages (not including title page and bibliography) and no more than 7 pages. Your essay should be typed, 10- or 12-point, double-spaced and spell-checked. Please submit an ecopy of your paper to the link in the Assignments folder in the NYUClasses website for the course.
- (b) Your essay should conform to the Paper Guidelines on the unofficial course website:  
[http://research.engineering.nyu.edu/~jbain/spacetime/paper\\_guidelines.pdf](http://research.engineering.nyu.edu/~jbain/spacetime/paper_guidelines.pdf)
- (c) Your essay must include a bibliography that minimally includes the relevant course readings. Your essay must use this bibliography as a source to cite for all claims and quotes you attribute to authors. (Don't list the lecture slides and/or lecture notes in your bibliography.)
- (d) Your essay will be graded solely on its content, and not on spelling or grammar. If you have trouble with spelling or grammar, Tandon's Writing Center is available to students and offers online help with proof-reading essays:  
<https://nyupoly.mywconline.com>

1. Describe in detail Clarke's "Dynamic Shift" argument for the existence of absolute space. How does it differ from Leibniz's "Kinematic Shift" argument against absolute space? How does Leibniz respond? Do you think this response is adequate? Why?
2. The definition of Newtonian spacetime attributes certain properties to spacetime points. Describe how these properties provide a substantialist explanation of the bucket experiment. Now explain how a relationist can adopt this definition (*hint*: a relationist claims spacetime points do not exist; rather, all that exists are physical objects). In relational Newtonian spacetime, explain why (i) the universe cannot be statically shifted, (ii) it can be kinematically shifted, and (iii) a relational account of inertia can be given. (This is Problem #2 on pg. 195 of Huggett's text.)
3. Describe Kant's argument for the existence of absolute space based on the existence of incongruent counterparts. Why are experiments done in the 1950s on Cobalt-60 decay processes relevant to this argument? Explain how a relationist could respond to it. Which do you think is more convincing and why?
4. The debate between absolutists and relationists focuses on two types of physical phenomena: inertial effects, and physically distinct incongruent counterparts (like Cobalt-60 decay processes). How are these phenomena explained by (i) an absolutist; (ii) an "extrinsic" relationist, who only accepts quantities of motion that are relational (*i.e.*, two-place) properties; and (iii) an "intrinsic" relationist, who will accept some quantities of motion that are monadic (*i.e.*, single-place) properties? Which of these explanations is more convincing and why?