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# Sections or topics from Knight that we have skipped

We have skipped the following (sub)sections of Knight thus far:

- Chapter 8: § 8.3–8.4 (fictitious force was briefly mentioned in lecture).
- Chapter 9: § 9.6.
- Chapter 11: § 11.6.
- Chapter 12: § 12.3 (but note the definition of $I$ and Table 12.2 buried in it), portion of § 12.9 (kinetic energy of a rolling object), § 12.10, and § 12.11.
- Chapter 13 and Chapter 14 are completely omitted.
- Chapter 15: § 15.6
- Chapter 17: § 17.8
- Chapter 18: § 18.1, § 18.4–18.6
- Chapter 19: § 19.4

# Topics covered in addition to or differently from Knight

- We looked into drag force more carefully, distinguishing between vicious drag and turbulent drag, and introduced the Reynolds number as a criterion to determine which form of drag force to use (reading: "Notes on drag force").
- We talked about center of mass (CM) and motion of CM in the context of momentum, from which we obtain the "macroscopic" Newton's Laws (reading: Giancoli § 9.8–9.9).
- For rolling motion (covered in Knight § 12.9), our analysis is based on Newton's and Euler's second laws rather than energy (reading: "Notes on rolling motion").
- For fluid dynamics, we considered the viscous flow described by the Hagen-Poiseuille equation in addition to the inviscid flow described by the Bernoulli equation (reading: "Notes on viscous flow").

# Additional practical simplifications

- In all calculations strings will be massless.
- Similarly, in all calculations springs will be massless.
- Pulleys will either be massless and frictionless, or massive but in contact with non-slipping strings.
- The center of mass (CM) of all continuous objects can be obtained by combining symmetry arguments and the divide and conquer strategy (i.e., you do not need to compute directly using the crazy-looking integral).
- In calculations of final velocities in an elastic collision, at least one object will be initially at rest.
- The moment of inertia of all continuous objects can be obtained by combining known results from simple shapes (including point mass), the parallel-axis theorem, and the divide and conquer strategy (again, no need to compute directly using the crazy-looking integral).
- All rolling motions will be non-slipping. In addition, a rolling object will always be a "round object," whose center of mass is located at its geometrical center.
- All gases can be assumed to be ideal. All cases in which the ideal gases may not be monoatomic will be *explicitly* stated.
- All ideal gas processes will be quasi-static.
- All detailed analysis of ideal gas processes will involve only a monoatomic gas. All detailed analysis of heat engine will involve only a monoatomic ideal gas.