

Homework #2 Due February 3.

- I will be out of town on Tuesday, January 27, so there will be no class.
- Read Section 9 in Gelfand & Fomin.
- Here is some practise in solving Euler's equation. In each case you should find an extremal for the variational integral

$$\mathcal{F}(u) = \int_a^b F(x, u(x), u'(x)) dx$$

subject to the boundary conditions $u(a) = c$ and $u(b) = d$.

1. $F(x, u, p) = 2u + p^2$, $(a, c) = (0, 0)$, and $(b, d) = (1, 1)$.
2. $F(x, u, p) = p^2 + 2up$, $(a, c) = (-1, 1)$, and $(b, d) = (2, 0)$.
3. $F(x, u, p) = p^2 + 2xp + x^2$, $(a, c) = (0, 0)$, and $(b, d) = (1, 0)$.
4. $F(x, u, p) = p^2 + 2up + u^2$, $(a, c) = (0, 0)$, and $(b, d) = (2, 1)$.
 - Now some practise with vector-valued functions. These are from p. 50 in Gelfand & Fomin.
5. #1.
6. #2 a).
7. #2 b).
8. #3.