

1. $T \rightarrow \text{extr}, \int_0^T ((x''(t))^2) dt = 1, x(0) = x'(0) = 0, x'(T) = 1$
2. $x(2) \rightarrow \min, \int_0^2 (x'(t))^2 dt = 2, x(0) = 0, |x'(t)| \leq 2$
3. $\int_0^1 (x^2(t) + (x'(t))^2) dt \rightarrow \text{extr}, x(0) = 1$
4. $\int_0^1 (x'(t))^2 dt + 4x^2(0) - 5x^2(1) \rightarrow \text{extr}$