Papers by A.A.Markov and L.E.Dubins

$$\dot{x}_p = \sin\theta$$
$$\dot{y}_p = \cos\theta$$
$$\dot{\theta} = u$$
$$|u| \leq 1$$

A.A.Markov (1889). Some examples of the solution of a special kind of problem on greatest and least quantities Soobscenija Charkovskogo matematiceskogo obscestva, Vol. 2, 1, N° 5, 6, 250–276.

L. E. Dubins (1957). On curves of minimal length with a constraint on average curvature and with prescribed initial and terminal positions and tangents. Amer. J. Math., Vol. 79, 497–516.

Нѣсколько примѣровъ рѣшенія особаго рода задачъ о наибольшихъ и наименьшихъ величинахъ.

А. А. Маркова.

ЗАДАЧА 1.

Между данными точками A и B (см. фиг. 1-ю) провести кратчайшую кривую линію при слѣдующихъ двухъ условіяхъ: 1) радіусъ кривизны нашей кривой повсюду долженъ быть не меньше данной величины ϱ, 2) въ точкѣ A касательная къ нашей кривой должна имѣть данное направленіе AC.

РѢШЕНІЕ.

Пусть M одна изъ точекъ нашей кривой, а прямая NMT соотвѣтствующая касательная.

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ON CURVES OF MINIMAL LENGTH WITH A CONSTRAINT ON AVERAGE CURVATURE, AND WITH PRESCRIBED INITIAL AND TERMINAL POSITIONS AND TANGENTS.*[1]

By L. E. Dubins.

We have now established our main result:

THEOREM I. *Every planar R-geodesic is necessarily a continuously differentiable curve which is either* (1) *an arc of a circle of radius R, followed by a line segment, followed by an arc of a circle of radius R; or* (2) *a sequence of three arcs of circles of radius R; or* (3) *a subpath of a path of type* (1) *or* (2).