Uniformly Accelerated Motion

Equal increments in *speed* in equal increments of *time*

$$v_{acquired} \propto t_{elapsed}$$

$$(v = at;\ s = ½\, at^2)$$

versus

Equal increments in *speed* over equal increments of *space*

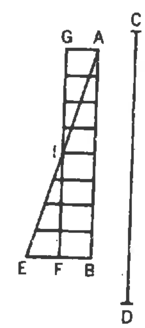
$$v_{acquired} \propto s_{traversed}$$

$$(s = ce^{bt}; v = c \cdot be^{bt})$$

Mean Speed Theorem

Prop. 1. **The time in which a certain space is traversed by a moveable in uniformly accelerated movement from rest is equal to the time in which the same space would be traversed by the same moveable carried in uniform motion whose degree of speed is one-half the maximum and final degree of speed of the previous, uniformly accelerated, motion.**

Let line AB represent the time in which the space CD is traversed by a moveable in uniformly accelerated motion from C. Let EB represent the maximum and final degree of speed increased in the instants of the time AB. All lines reaching AE from single points on the line AB drawn parallel to EB will represent the increasing degrees of speed after the instant A. Next I bisect BE at F and I draw FG and AG parallel to BA and BF; the parallelogram AGFB will [thus] be constructed, equal [in area] to the triangle AEB, its side GF bisecting AE at I.



Upshot: Problems involving uniformly accelerated motion can be reduced to problems involving only uniform motion.