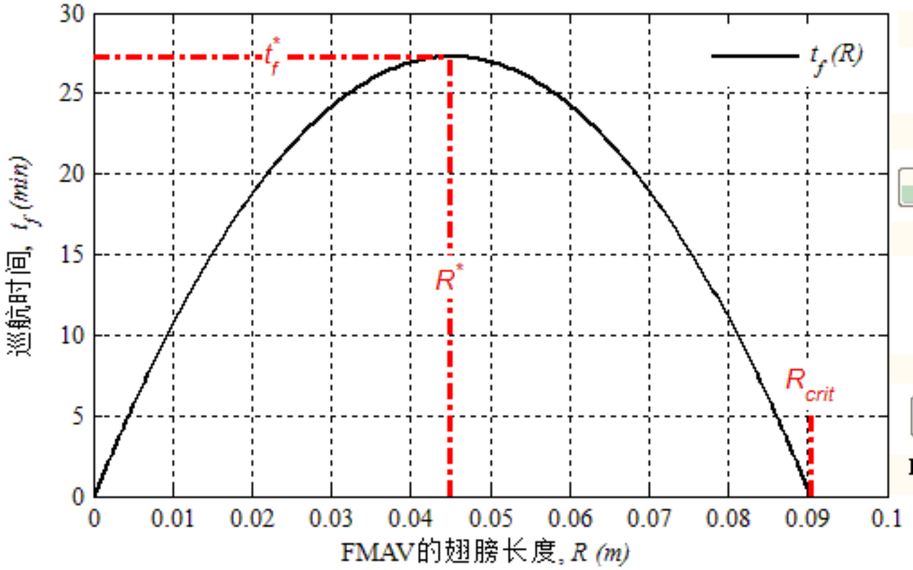
扑翼微飞行器的概念设计

模块一 Flight Time vs Wing Radius

给定FMAV重量下,飞行时长取决于翅膀长度的平方



Plot Mass & Time

Payload Mass Fraction (%) 25

Wing Radius (m) 0.015

Calculate M_act Fraction

Actuator Mass Fraction (%) 12.4576

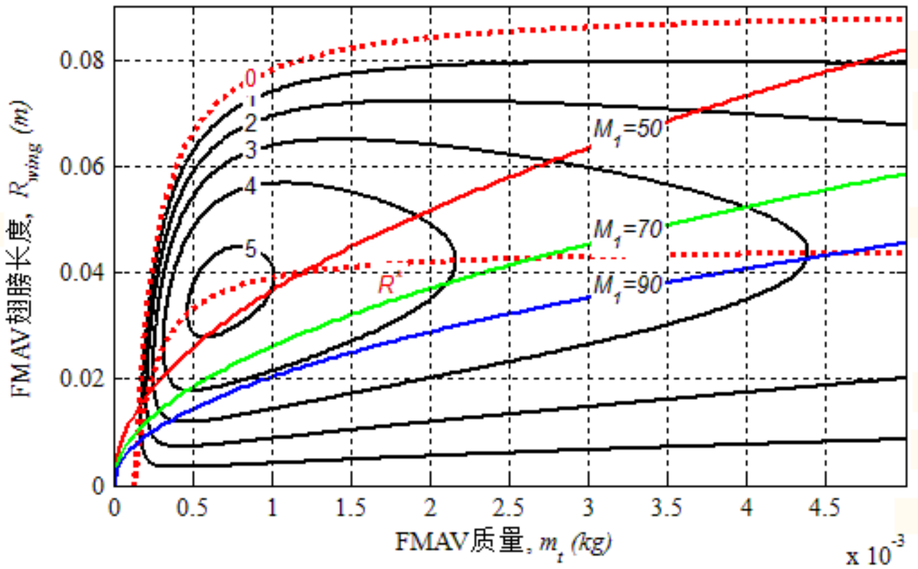
FMAV Mass (mg) 60

Calculate Flight Time

Flight Time (min) 15.115

模块二 Wing Length VS FMAV Mass+ under Prescribed time

翅膀惯性结构极限下确定的最小翅膀长度与FMAV质量(考虑附加负载)的关系



Plot R vs M @t

Payload Mass Fraction (%) 25

Time Prescribed (min) 5

FMAV Mass (mg) 1000

Wing's Struct-Efficiency 70

Calculate

Payload Mass (mg) 100

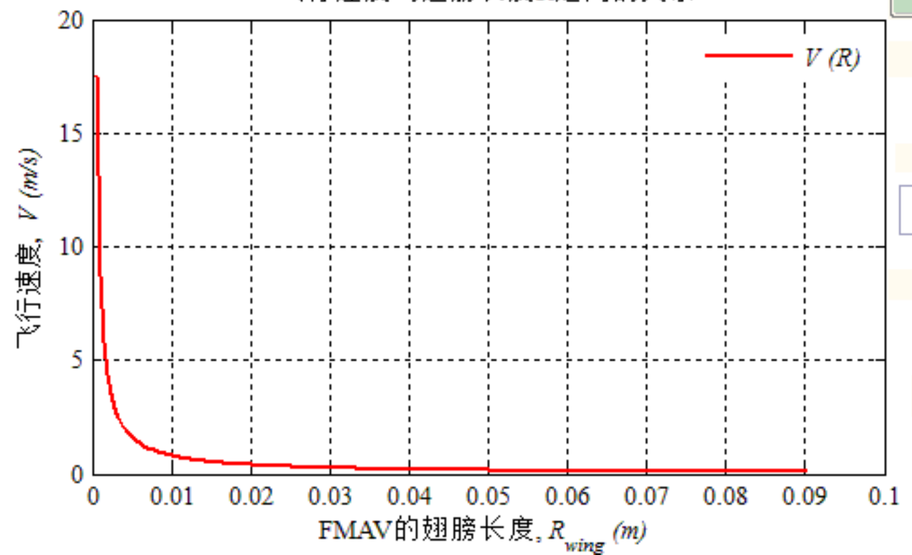
Wing Length No.1(m) 0.0367074

Wing Length No.2(m) 0.0415582

Wing Length Minimum (m) 0.0262033

模块三

飞行速度与翅膀长度R之间的关系



Plot Flight Speed

Payload Mass Fraction (%) 25

J 0.15 Wing Radius (m) 0.015

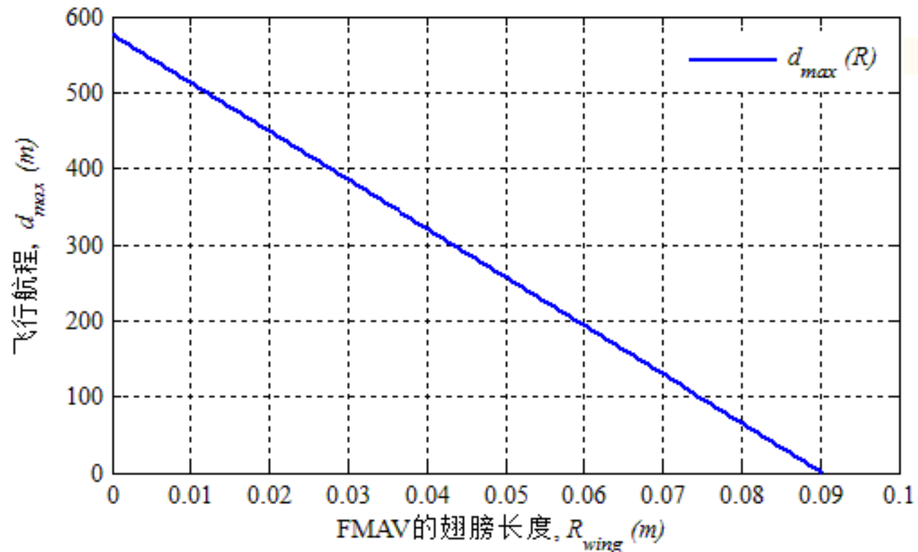
FMAV Mass (mg) 60

Calculate

Flight Speed (m/s) 0.530516

模块四

飞行航程与翅膀长度R之间的关系



Plot Flight Range

Payload Mass Fraction (%) 25

J 0.15 Wing Radius (m) 0.015

Calculate

Flight Range (m/s) 481.125