Study notes for Chapter Seven of *Solar Sailing: Technology, Dynamics, and Mission Applications* by Colin R. McInnes last edit 2016 March 11 MBM

pXXY means page XX. Y = t/m/b for top/middle/bottom third of page

p272b Note that sail is assumed perpendicular to laser beam. Hwat is location of lens, and how is it held in that location? It is itself a solar sail, and hwat is its size compared to the sail? Fig.7.1 suggests it is smaller. See p.285m, p287b.
Eq.7.1 neglects (negligible?) acceleration from sunlight.

p273m In Eq.7.3 everything is fixed so *a*~ is constant.

p274t Unless power or focus is variable, sail will be hot hwen close to source. This is covered later.
Eq.7.6 λ times s, not λ_s, visually difficult. From $d_S = S\theta$ and eq.7.5. Need numerical example.

p274m Eq.7.8 Since energy is expended should there be a minus sign in front of E_R? Integrates to $(1/2)u^2(m(t)-m_0)$.
Eq.7.10 Rearrange to $m_0 = m_f e^{(\Delta v/u)}$.

p274b For a(n ideal) light sail, the ...

p275t Eq.7.14 ≈ $(u^2/c\Delta v)[1 + \Delta v/u + \ldots - 1] = u/c$ = eq.7.15a.

p275m Special meaning to curved << symbol compared to straight >> symbol? Seems to be typography, not difference.
Eq.7.15b etc. Need numeric example with efficiencies.

p275b curved < and >? Seems to be italic. Not a Karp symbol. See p122 and p124.

p276b Eq.7.17 => $v^2 = 2a\tilde{}s\tilde{}$ if s>s~. Eq.7.18 => $v_\infty^2 = 2a\tilde{}s\tilde{} + 2a\tilde{}s\tilde{}$ s>s~.

p277t Fig.7.3 Hard to see that horizontal line at 1 is v~.

p277m From Eqs. 7.19, 7.7 and 7.3

p278t ...is required by a relatively long coast phase ...

p278m Eq.7.24
$$\begin{aligned} t &= \sqrt{2s\tilde{}/a\tilde{}} + (s-s\tilde{})/\sqrt{2a\tilde{}s\tilde{}} \\ &= \sqrt{2/a\tilde{}}\sqrt{s\tilde{}} + \sqrt{2}(s-s\tilde{})/2\sqrt{a\tilde{}s\tilde{}} \\ &= \sqrt{2/a\tilde{}}\sqrt{s\tilde{}} + \sqrt{2}(s)/2\sqrt{a\tilde{}s\tilde{}} - \sqrt{2}(s\tilde{})/2\sqrt{a\tilde{}s\tilde{}} \\ &= \sqrt{2/a\tilde{}}\sqrt{s\tilde{}} + \sqrt{2/a\tilde{}}(s)/2\sqrt{s\tilde{}} - \sqrt{2/a\tilde{}}(s\tilde{})/2\sqrt{s\tilde{}} \\ &= \sqrt{2/a\tilde{}}[\sqrt{s\tilde{}} + (s)/2\sqrt{s\tilde{}} - (s\tilde{})/2\sqrt{s\tilde{}}] \\ &= \sqrt{2/a\tilde{}}[\sqrt{s\tilde{}} + (s)/2\sqrt{s\tilde{}} - (s\tilde{})/2\sqrt{s\tilde{}}] \\ &= \sqrt{2/a\tilde{}}[\sqrt{s\tilde{}}/2 + (s)/2\sqrt{s\tilde{}}] \\ &= \sqrt{1/2a\tilde{}}[\sqrt{s\tilde{}} + (s)/\sqrt{s\tilde{}}] \\ \text{Define } s = ks\tilde{} \quad &= \sqrt{1/2a\tilde{}}[\sqrt{s\tilde{}} + (ks\tilde{})/\sqrt{s\tilde{}}] \\ &= \sqrt{1/2a\tilde{}}[\sqrt{s\tilde{}} + (k\sqrt{s\tilde{}}] \\ &= \sqrt{1/2a\tilde{}}\sqrt{s\tilde{}}[1 + k] \end{aligned}$$
... "It can be seen that the coast time scales inversely" as a~s~.
Looked at this way it scales as $\sqrt{s\tilde{}/a\tilde{}}$

p279-281 check math.

p279m Eq.7.26 ?
"normalized" means speeds given in fractions of c.
Eq.7.28 $2P'/c = f = (2P/c)[(1-\beta)/(1+\beta)]$

p279b "It can therefore be concluded that..." ?

p280m Eq.7.33 I get $\beta(\tau) = (\tau - \tau_0)/\tau$

p285m lens moved by light pressure?

p286b d*E*/d*x* stopping power of sail film, energy over thickness?

p283t agglomeration?

p287b Change “between” to “among”.

p290b How to physically separate ring, or is its β > that of center disc plus payload?