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| MOW 323 – Exam | Question 3 |
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1. No, since there is no minimum weight requirements and the literature study showed that the majority of the vehicles mass should come from other components. It is common however to use the mass as the cost function when designing for yielding or buckling, but I think the priority needs to be to ensure that the arm can move through the required envelope (metric still undefined) and stabilize the camera adequately according to (UR2)
2. The metric X, if measured does not ensure the direct compliance of (UR2). Proposed metrics:
   1. Linear accelerations of camera while moving in m/s^2 < Y.
   2. Rotational acceleration of camera while robot is moving in rads/s^2 < Z.
   3. Values for Y and Z can be researched for appropriate values.
3. There are different power load cases:
   1. Acceleration – getting the SIV to top speed (no requirement to enforce)
   2. Maintain Climb rate – energy at specific height will be the height multiplied by acceleration due to gravity multiplied by vehicle mass:

DWS: power will be the height velocity multiplied by acceleration due to gravity multiplied by vehicle mass:

* 1. Power due to air resistance – Low speed negligible.
  2. Power due to obstacle – This will probable be the limit case, but data is needed to calculate this parameter.

1. The SIV may not exceed a speed of 2 km/h in any condition, so the proposed calculations are:
   1. Calculate required braking force to maintain a maximum speed of 2km/h on the steepest downslope of 5degrees
   2. Since the batteries of the SIV uses a large chuck of the vehicles mass. It may be beneficial to use regenerative braking to help with the complacence of (UR1). So calculate the efficiency gain by using regenerative braking taking the new mass of the battery and extra components into account.