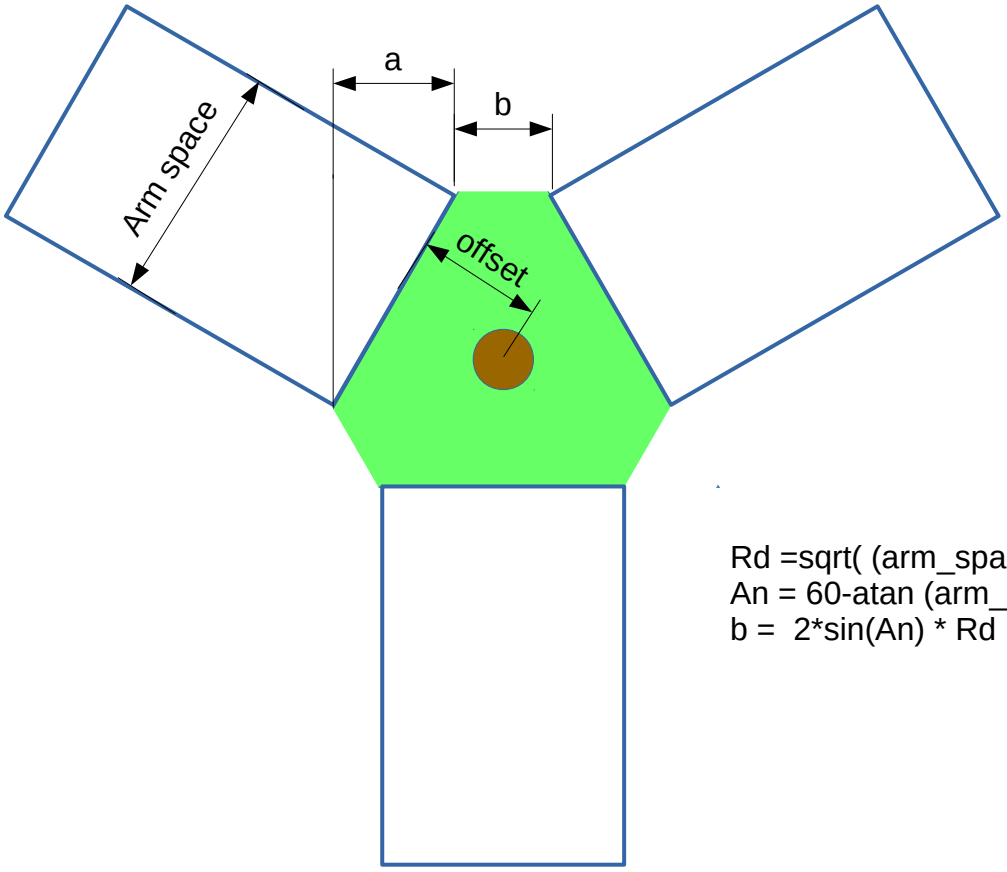
Delta robot effector stability

PRZ, 5 february 2016



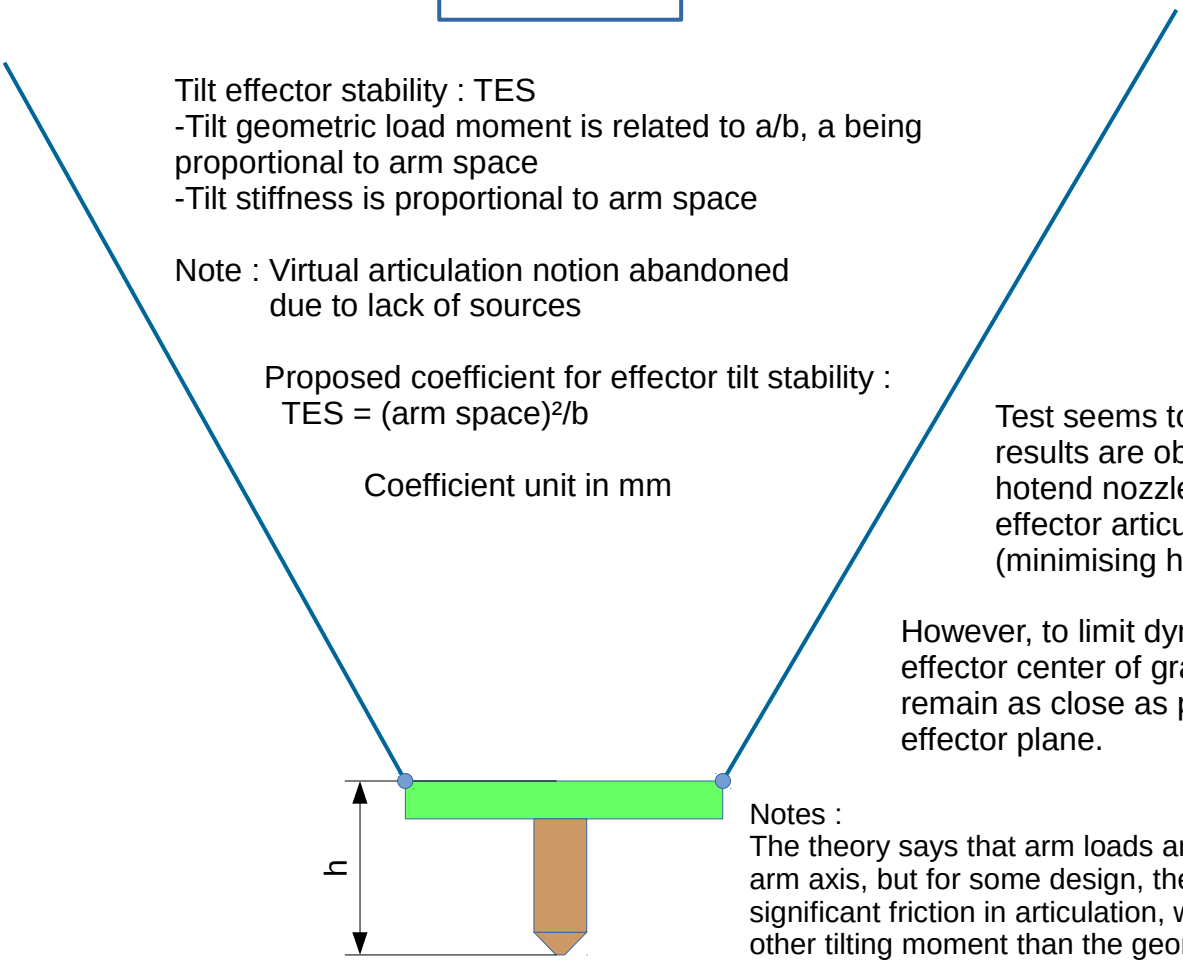
Rd =sqrt((arm_space/2)²+offset²)
An = 60-atan (arm_space/2/offset)
b = 2*sin(An) * Rd

Tilt effector stability : TES
-Tilt geometric load moment is related to a/b, a being proportional to arm space
-Tilt stiffness is proportional to arm space

Note : Virtual articulation notion abandoned due to lack of sources

Proposed coefficient for effector tilt stability :
TES = (arm space)²/b

Coefficient unit in mm



Test seems to show that best results are obtained for hotend nozzle near the effector articulation plane (minimising h dimension).

However, to limit dynamic moments, effector center of gravity shall remain as close as possible to the effector plane.

Notes :
The theory says that arm loads are always along arm axis, but for some design, there may be significant friction in articulation, which creates other tilting moment than the geometrical one.

There are other sources of instability, but the geometrically based unstability is not always well understood by designers.