

**-0** (124) -10000 (1) -1000 (2) -100 (1) **-10** (6) **-11** (9) -125 (1) -150 (1) -175 (1) **-1** (21) -20000 (1) **-2000** (3) -20 (1) -  
22 (2) -240 (1) -25 (1) **-29** (4) **-2** (3) -2cos (2) -2lmed (2) -30000 (1) -3000 (2) -30 (1) -3 (2) -4000 (2) -4 (2) -500 (1) -50 (1) -  
5 (4) -6000 (1) -60 (1) -6 (1) -7500 (1) -75 (1) -8cos2 (1) -8cos (1) -a (1) **-comx** (4) **-comy** (4) **-comz** (3) **-COS** (12) -  
**cosa** (5) -ksc (1) -l1 (2) **-l2** (4) **-l** (16) -ldamp (1) -lmed (2) -lrec (2) **-p** (4) -pcom (1) **-pfacility** (11) -pi (1) **-r** (6) -  
**sin** (18) **-sina** (5) -they (1) **-u** (5) -v (1) -xz (2) -y0 (1) **000064m2** (3) **000m** (2) **000n** (1) **00111382rad** (1)  
**00113905rad** (6) **0017m** (1) **008m** (1) **010kg** (1) **015kg** (1) **025rad** (1) **026707rad** (2) **04kg** (1) **05kw** (1) **07m** (1) **08m** (1)  
0divisions (1) 0divs (1) **0m** (5) **0nm** (1) **0rad** (7) **0s** (1) **1-** (6) **1-cos2** (3) **10-a** (1) **10-p** (1) **1000kg** (1) **1000km** (2)  
**1000m** (9) **1000nm** (6) **100kg** (7) **100km** (2) **100m** (6) **100ns** (2) **100s** (1) **10a** (3) **10b** (2) **10c** (1)  
**10calculatedas** (1) **10conclusions** (1) **10d** (2) **10gw** (1) **10kg** (11) **10km** (2) **10m** (2) **10mmet** (1) **10with** (1) **11a** (1) **11b** (1)  
**11cgivesan** (1) **11d** (1) **11e** (2) **11figures** (1) **11m12** (1) **11m1** (4) **11m22** (1) **11m2** (3) **11mfacility** (2) **11mmet** (1)  
**11specifically** (1) **11that** (2) **11this** (1) **12a** (1) **12c** (1) **12e** (1) **12for** (1) **12m** (1) **12midpointlocation** (1) **12mmet** (1) **12to** (1) **13a** (2)  
**13after** (1) **13b** (1) **13e** (1) **13mmet** (1) **144376s** (1) **145m1** (2) **14a** (1) **14b** (2) **14e** (1) **14km** (1) **14l** (2) **14mmetdeploymentwith** (1)  
**1500ns** (1) **1570kg** (5) **15a** (1) **15b** (1) **15case1** (1) **15e** (1) **15kg** (2) **15mmet** (1) **16a** (2) **16case2** (1) **16cos2** (1) **16e** (3)  
**16kg** (2) **17a** (1) **17case3** (1) **17e** (1) **17plotsoftensionvs** (1) **180rad** (2) **187km** (1) **18a** (2) **18b** (1) **18case4** (1) **18e** (1) **18m** (1)  
**18plotsofstressvs** (1) **19case5** (1) **1cm** (1) **1div** (2) **1division** (1) **1gp** (1) **1in** (1) **1j** (5) **1kg** (2) **1km** (2) **1l1** (1) **1m** (3)  
**1mpayload** (1) **1onthestate-of-the-artanaloguecomputer** (1) **1rad** (5) **1rotational** (3) **1the** (1) **1where** (1) **20-digit** (1)  
**2004a** (4) **2004b** (1) **208129s** (2) **20case6** (1) **20kg** (1) **20mtether** (1) **20rad** (1) **21i** (1) **22m1** (4) **22m2** (2) **238km** (1)  
**25000s** (1) **250m** (3) **25kg** (3) **25m** (2) **27kg** (1) **29m2** (2) **2a** (5) **2andsection3** (1) **2asthestartpoint** (1) **2b** (3)  
**2bisincreased** (1) **2c** (1) **2cos2** (1) **2cos** (2) **2d** (9) **2divisions** (1) **2divs** (2) **2h** (2) **2j** (5) **2lmed** (2) **2lpayload** (1) **2lr** (6) **2m** (1)  
**2mpayload** (2) **2mtether** (1) **2n** (2) **2nmtether** (1) **2p** (18) **2pearson** (1) **2rad** (1) **2rotating** (1) **2t** (1) **2that** (1) **2where** (1) **2with** (1)  
**3000km** (1) **35m2** (1) **35mfacility** (1) **35mtether** (1) **35rad** (1) **377m** (3) **38m** (1) **3a** (4) **3are** (1) **3b** (4) **3c** (1) **3cos** (2) **3d** (14)  
**3divs** (1) **3from** (1) **3gp** (1) **3in** (1) **3km** (1) **3kw** (2) **3m** (1) **3matrix** (1) **3moravec** (1) **3mpayload** (2) **3rotationmatrixforageneralised** (1)  
**3showstheorbital** (1) **3sub-spans** (3) **3the** (1) **3there** (1) **3walkalong** (1) **3walkalongtheedgesof** (1) **400kg** (1) **400m** (1) **4150rp** (1)  
**425mtether** (3) **430rad** (1) **4400mtether** (2) **440m1** (2) **440m2** (2) **440mfacility** (2) **460m** (1) **46m** (1) **4a** (1) **4b** (1) **4hp** (1) **4i** (1)  
**4mpayload** (1) **4note** (1) **4or** (1) **4r2** (4) **4sub-spans** (1) **4the** (1) **50000s** (1) **500kg** (6) **50m** (2) **54kg** (1) **576n** (1) **5b** (1)  
**5bc49jb1115** (1) **5c** (1) **5d** (1) **5degreeoffreedommodel** (1) **5flexural** (1) **5fordetails** (1) **5if** (1) **5kg** (2) **5km** (1) **5m** (1) **5massive** (1)  
**5masspoints** (1) **5mtether** (7) **5mx6m** (1) **5sub-spans** (1) **6307s** (1) **64mm2** (2) **6b** (1) **6c** (2) **6d** (1) **6gp** (1) **6note** (1)  
**6recall** (1) **6rotations** (1) **6showing** (1) **6themultiplescalesmethod** (1) **720kg** (1) **7460m** (1) **75gp** (1) **75kg** (1) **75s** (1) **7a** (1)  
**7ashowstheeffectthataasmallchange** (1) **7b** (2) **7c** (1) **7km** (1) **7l** (1) **7m1** (2) **7m** (1) **7mfacility** (2) **7see** (1) **7the** (2) **7this** (1) **82kg** (2)  
**85m** (1) **85mtether** (1) **8gp** (1) **8indeed** (1) **8kg** (2) **8m** (1) **8mm** (1) **8qq** (1) **8the** (1) **8theypropose** (1) **8this** (1) **933gp** (1) **95s** (1)  
**96m** (1) **9a** (1) **9b** (3) **9c** (1) **9cand5** (1) **9d** (1) **9e** (1) **9gp** (4) **9hohmann** (1) **9mm** (1) **9or** (1) **9this** (1)  
**9thisassumesthatthemission** (1) **a1** (1) **a2mx3m** (1) **a5degreeoffreedommodel** (1) **a5year** (1) **aaron** (1) **ab** (1) **ability** (2) **able** (3)  
**about20** (1) **about** (37) **abouttheoriginaround** (1) **above** (10) **abovethe** (1) **abshcom** (1) **abshcoml** (1) **absolute** (4)  
**absolutely** (1) **abstract** (2) **academicpartnership** (1) **accelerated** (1) **accelerating** (2) **acceleration** (15) **accelerations** (2)  
**acceptable** (8) **acceptably** (1) **accessible** (1) **accommodate** (1) **according** (1) **accordingly** (1) **account** (5)  
**accountantswanteverything** (1) **accuracy** (4) **accuracygoal-** (1) **accuracygoal** (2) **accurate** (3) **accurately** (4)  
**accuratelydescribes** (1) **achapterof** (1) **achievable** (2) **achieve** (2) **achieved** (2) **acknowledgements** (2) **acknowledges** (1)

aconservative (1) **across** (4) **act** (4) acta (1) acting (2) **action** (3) **active** (3) actively (1) **acts** (3) **actual** (3)  
adaptively (1) **added** (3) addedtotheposition (1) adding (2) **addition** (5) **additional** (11) **additionally** (4)  
additionofinclinationtotethermodel (1) additionoflength (1) adequate (1) adistance (1) adjusted (1) adjustment (1) adumbbelltether (1)  
**advantage** (4) advantageous (2) **advantages** (4) adverse (1) adversely (1) advisability (1) aeronautical (1) aerospace (1)  
afacility (1) afeewmembers (1) **affect** (4) aforcebe (1) afree (1) **after** (20) afterpayload (2)  
afurtherwtotethersarejoinedtothefacility (1) again (1) **against** (6) ageneral (1) ageneralised (1) ageneric (1) aging (1) aid (1)  
ailsa (1) **aim** (4) aiming (2) aingap (1) air (1) **al** (37) alargegeneric (1) algebra (1) algorithm (2) **algorithms** (3) **align** (3)  
**aligned** (7) aligning (1) aligns (2) alike (1) **all** (16) **allow** (3) allowable (1) allowance (1) allowanceforthepayload (1)  
allowing (2) **allows** (10) allstageswillnot (1) alltheadministrativestaff (1) alltimes (1) **almost** (3) **along** (22) alongside (2)  
alongthetether (1) alowearthorbit (1) alpha (2) alphabet (1) **also** (8) alter (1) altered (1) **alternative** (5) alternatively (2)  
alternativetether (1) although (2) **altitude** (7) am (1) amagneticbuckling (1) american (1) americas (1) amethod (1)  
amomentum (1) amounts (1) amplified (1) **an** (136) anadamspredictor-corrector (1) **analyse** (3) **analysed** (7)  
analyses (1) **analysing** (4) **analysis** (19) analysisof (2) analysisoflengthdeploymentof (1) analysisshouldbeperformed (1)  
**analytical** (5) ananalysiswasperformed (1) ananalysiswillbeperformed (1) anangle (2) anangleof (1) and2d (1) and3 (1)  
and4 (1) **and** (563) andb (1) andbraking (1) **andcartmell** (3) anddeploymentphases (1)  
anddoublepyramidformations (1) andfollow (1) andfuel (1) andfunds (1) andgearbox (1) andgive (1) andglobal (1)  
andheatdissipation (1) andi3 (2) andi4 (1) andi5 (1) andi (1) andjane (1) andjanin (1) andled (1) andlegofromavery (1)  
andlunaranchored (1) andmisra (2) andmook (1) andone (1) andpayload (2) andphysical (1) andprovided (1) andross (1) andthe (1)  
andtheposition (1) andtherefore (1) andthisposes (1) andthispresentsaset (1) andyellow (1) anexperiment (1)  
anexpressionforthecentreof **angle** (50) anglebetween (1) angleof (1) **angles** (13) **angular** (36)  
angulardisplacementsof (1) angularvelocities (1) **angularvelocity** (3) animated (1) anomaly (1) anonlinear torque (1) anout-of-  
planespinequal (1) anova (2) **antenna** (3) **any** (14) anyout-of-planecomponentinthelocal (1) apart (2) apentagonallayout (1)  
aplanar (1) **apogee** (33) apogeeand (1) appear (1) appeared (1) **appears** (3) appendices (1) **appendix** (6)  
applications (1) **applied** (7) apply (1) **approach** (4) approachtothe (1) appropriate (1) approx (2) approximate (1)  
**approximately** (20) approximation (1) apractical (1) aproblem (1) aprogressive (1) aproportional (1) apsidal (1)  
aquantity (1) arbitrarily (1) **arbitrary** (5) ardsback (1) arduous (1) **are** (210) **area** (8) **areas** (3) arecomparable (1)  
aredesigned (1) areemployed (1) arefound (1) arefurthest (1) aremultiple (1) arenotbraked (1) arenotpronetogimbal (1) ares (1)  
reshown (1) arethe (2) ariadna (1) arise (1) arises (1) **arm** (9) armature (1) **arms** (17) armsof (1) **around** (27)  
arrangement (2) arrays (2) arraysharnessing (1) arrive (2) **article** (3) articles (1) artificial (1) artsutanov (1) **as** (211)  
asabasis (1) asadirect (1) asafety (1) asageneralised (1) ascanbeseen (1) ascertain (1) aseach (1) asfaras (1) asfigure5 (1)  
ashasbeenshown (1) asignificant (2) asignificantdegreeofpost-processing (1) asimplying (1) aslowerrecovery (1) asmallchange (1)  
asmalltetherasymmetry (1) asneeded (1) aspacestationor (1) aspect (1) aspreviously (1) **assemble** (6) assembled (2)  
**assembling** (3) assembly (2) assessed (1) **asshown** (3) assigned (1) assigning (1) assistance (1) associated (2)  
asstress (1) assume (1) **assumed** (10) assumes (1) **assuming** (4) **assumption** (9) assumptionmay (1)  
**assumptions** (6) astabilising (1) astaged (1) astetherasymmetry (1) asthe (2) asthecomdisplacementplotsshow (1)  
asthemass (1) astounding (1) astronautica (1) astronautics (1) astructured (1) aswith (1) **asymmetric** (4)  
**asymmetrical** (9) asymmetricaldumbbellinertial (1) asymmetrically (1) asymmetries (1) asymmetriesbetweenthesub-

spans (1) **asymmetry** (11) asymmetryin (1) asymptote (1) asystem (1) at167km (1) **at** (63) atanangletothorbital (1)  
atapogee (1) ataround100kn (1) atether (1) atetherpayload (1) atetherreleasing (1) atethersystem (1) atethersystemare (1) athree-  
mass (1) atleast (1) **atmosphere** (4) atower (1) atperigee (2) atrancheof (1) atriangular (1) attached (2) attainable (1) attained (1)  
attatched (1) attempts (1) attention (1) atthe (1) attheend (1) augmentedby (1) author (2) authored (1) authorship (1)  
authorwishestoacknowledge (1) **automatic** (5) availability (1) **available** (4) availablefor (1) ave (1) **average** (3)  
**avoid** (5) avoided (2) avoiding (2) away (1) awayfromthecentre (1) aweakstabilityboundary (1) awelded (1) axes6 (1)  
**axes** (18) axesareinthey-zplane (1) axial (1) **axis** (12) axle (1) ay (1) b-axis (1) ba (1) back (2) backbone (1)  
background (1) backlash (1) backward (2) backwards (2) ballance (1) ballistic (2) ballistically (2) barber-pole (1) barber (1)  
**base** (3) **based** (12) **baseline** (4) basis (1) **be** (194) beam (1) bearing (1) **because** (8) become (1)  
**becomes** (4) **been** (26) **before** (7) **behaviour** (29) behaviourof (1) behaviouroftheweb (1) behind (1)  
being (2) belbruno (2) beletsky (2) **below** (9) beneficial (2) benefiting (1) beng (1) bennettetal (1) beperformed (1) bepreferable (1)  
besignificant (1) best (2) betheuseofwebs (1) **better** (4) **between** (38) beyond (1) bi-elliptic (1) bibliography (1)  
biesbroek (2) bifurcation (2) big (2) binary (2) blue (1) **bodies** (4) **body** (11) **book** (3) boom (1) boost (1) boosting (2)  
**both** (13) bothpayload (1) bottom (1) boundary (2) bounded (1) **brake** (4) braking6 (1) **braking** (16) branch (1)  
branches (1) **breaking** (3) brief (1) briefly (2) bring (1) brings (1) broad (2) **broadly** (3) build (2) building (1) built (2)  
bulletin103 (1) burdensome (1) **burn** (5) **but** (15) buthasmadeastoundingprogresses (1) butthey (1) butthis (1) **by** (104)  
cable (1) **calculate** (3) calculated4 (1) **calculated** (23) calculates (1) **calculation** (4) calculations (2)  
calcuresults (1) called (2) calling (1) caltech (2) camaraderie (1) **can** (33) canachieveis (1) candidate (1) cannot (1)  
capabilities (1) **capable** (3) **capture** (14) captureand (1) **captured** (3) car (1) careful (2) caremustbetakentoassure (1)  
**carried** (3) **carroll** (3) cartesian (1) **cartmell** (16) cartmellet (2) case2 (1) case4 (1) **case** (98) casefor (1)  
casei4 (1) **cases** (37) casesi1 (1) casesi2 (1) casesi4 (1) castle (1) categories (2) catenaries (1) caters (1) caught (1)  
**cause** (3) caused (2) causes (2) causing (2) caution (1) celestial (1) cells4 (1) **cells** (5) **central** (8) centre-of-mass (1)  
**centre** (50) **centred** (6) **centref** (4) centro (1) centrotothe (1) centripetal (1) centripetally (1) **certain** (3)  
certainlybeafunctionoflength (1) chance (1) **change** (39) changed (1) **changes** (9) channel (1) chaotic (2)  
chapter2 (1) **chapter** (18) chapters (1) **characteristic** (8) **characteristics** (4) cheaper12 (1) cheaper (2)  
checked (1) checking (1) checkingfunction (1) checksfor (1) **choice** (5) choose (1) **choosing** (4) choosingtimesteps (1)  
chose (1) **chosen** (21) chosensothattheorbitalparametersareindependentfromthe (1) chris (1) **circular** (10)  
circularand (1) circumstances (1) cited (1) citedby (1) claims (1) clarity (1) **clarke** (3) class (2) clean (2) **clear** (4) clearance (1)  
**clearly** (10) clearlyshows (1) **close** (4) closedhub (1) cloth (1) clumsy (1) cluster (1) clustered (1) co-ordinates (2) co (1)  
**code** (4) codemodules (1) coefficient (2) coefficients (1) coiling (1) coincide (1) coincident (1) coincidentalwith (1)  
coincidentonthefacility (1) coldgas (1) colin (1) colinear (1) collaboration (1) collected (1) collecting (1) collection (1) collector11 (1)  
collector (1) collectors (1) collimating (1) **com** (102) combination (2) combinations (1) combined (2) come (1)  
comemorestable (1) **common** (5) commonly (1) communications2 (1) communications (2) commutative (2) compact (2)  
comparable (1) compare (2) **compared** (19) **comparing** (14) **comparison** (3) compensate (1)  
complemented (1) complete (2) completely (1) complex (1) complexities (1) complexity (2) complicated (2) complotsof (1)  
**component** (7) components (2) componentswithout (1) composed (2) compounded (1) compounding (1)

comprehensivedynamicalsystems (1) compressive (1) comprised (1) comprising (2) **computational** (3) computationally (1) computations (1) **comx** (7) **comy** (7) **comz** (7) concentrated (3) **concept** (10) **concepts** (3) conceptsthat (1) conceptual (2) conceptually (2) concern (2) concerned (2) concerning (1) concerns (1) conclude (2) **conclusions** (5) conclusionsand (1) conclusively (1) concrete (1) **condition** (3) conditions6 (1) **conditions** (38) conditionsand (1) conditionsfortimeperiod9 (1) conditionsof (1) conducting (1) conduction (1) conductive (1) conductiveheattransferof (1) cone (1) confer (1) confers (1) **configuration** (5) **configurations** (10) **configured** (3) confusion (1) **connected** (3) consequential (1) consequently (1) conservation (1) conservatism (2) conservative (1) **consider** (4) considerable (1) **consideration** (4) **considered** (5) **considering** (7) consist (1) consistent (1) constant-diameter (1) **constant** (9) constantly (1) constellation (1) constrained (1) constraining (1) constraint (1) constraints (1) **construct** (4) **constructed** (12) **constructing** (18) constructingtheequationsof (1) **construction** (11) contained (3) **containing** (6) contains (2) contents (1) context (1) contextualised (1) continually (1) continue (1) continues (1) continuetoposeproblemsfordecades (1) continuing (1) **contours** (5) contrast (1) **contribute** (4) contributing (1) contribution (1) contributions (1) **control** (16) controllawscanbestipulated (1) **controlled** (7) controlleddeployment (1) controller (1) controlling (1) controls (1) convenience (1) convenient (1) conventional (2) conventionally (1) conversations (1) conversely (1) converted (1) cooled (1) **coordinate** (45) coordinateconstruction (1) **coordinates** (31) coordinateshavebeenchosen (1) coordinatestoeight (1) coordinatesused (1) **coordinatesystem** (6) coplanar (1) corners (1) correct (1) correction (1) correlated (1) correspond (1) **corresponding** (4) correspondingly (2) **corresponds** (3) **cos2** (5) **COS** (177) **cosa** (4) **cosmo** (4) **cost** (7) costs (2) **could** (11) couldbeachievedby (1) couldbeplacedingeostationary (1) counter-intuitive (1) counter-intuitively (1) counter-rotation (1) counter-torque (1) counter (1) counteract (1) counterweights (1) **coupled** (4) course (2) cover (1) coverage (1) **covered** (4) coveredinthe (1) covering (1) **covers** (3) cr3bp (1) **crawl** (5) crawler (2) crawlers (1) create (2) criteria7 (1) **criteria** (3) **critical** (4) critically (2) criticallyreviewsthecurrent (1) **cross-sectional** (3) cross (1) **csa** (3) **current** (5) curvesgraphics6 (1) custom (1) cut (1) cuts (1) cutting (1) **cycle** (10) cycling (1) cylinder (2) dad (1) **damp** (6) damper (1) **damping** (3) danilinetal (1) darkness (1) das (1) dash (2) **data** (4) date (2) **daughter** (3) **david** (3) **day** (3) days (2) daysand8hours (1) dc (1) de-orbit (1) de-orbitareseenasnearertermgoals (1) de-spin (1) de-spun (1) deals (1) **debris** (10) dec (1) decays (1) decelerated (1) decelerating (2) decided (1) decision (2) declaration (1) declares (1) declination (1) decou (1) decoupled (2) decrease (1) decreasing (1) **default** (3) define (2) **defined** (16) defines (1) **defining** (5) **definite** (3) definition (1) definitions1 (1) deform (2) deformation (1) **deg** (6) degd (1) degenerate (1) degradation (2) **degree** (6) degrees (2) delays (1) deliberately (1) delivered (1) deliverytothemoonunderatime-varyinginclinationgivenbythesaroscycle (1) **deltav** (9) demands (2) **demonstrate** (5) demonstrated (2) **demonstration** (6) dense (1) **density** (6) department (1) departments (1) depend (1) **dependant** (3) dependence (1) dependent (2) depending (1) depends (1) deploy (2) **deployed** (11) **deploying** (11) **deployment** (50) deploymentand (2) depth (1) der (1) **derivation** (3) derivations (1) **derivative** (4) derive (1) **derived** (8) derivedbyfinding (1) derives (1) descent (1) **describe** (9) **described** (9) describedinthe (1) **describes** (3) **describing** (5) design-expert (1) **design** (9) **designed** (4) designs (1) desirable (1) **desired** (3) desktop (1) destabilising (2) detail (1) detailed (1) detailing (2) details (1) determine (1) **determined** (3) determines (1) detracts (1) develop (2) developed (1) developing (1) developments (1) develops (1) deviations (2) **device** (4) devised (1)

devoted (1) **diagram** (13) diagramof (1) diameter (2) diametrically (1) dictate (1) did (1) **differ** (5)  
**difference** (17) differences (5) **different** (16) differential (1) differentialequations (1) differentiated (1)  
differentparts (1) differenttypesoftethermissionproposedandflown (1) differs (2) **difficult** (6) difficulties (1) digestible (1) digits (1)  
dimensional (1) direct (1) **direction** (8) **directly** (4) disadvantage (1) disadvantages (1) **disc** (3) discover (1)  
**discrete** (6) **discretised** (3) **discretized** (18) discretizing (1) **discussed** (5) discusses (1)  
**discussion** (3) discussions (2) disordered (1) **displacement** (4) display (1) dissipated (1) dist (2) **distance** (9)  
distances (1) **distributed** (3) **distribution** (3) div (2) divide (2) divided (2) **dividing** (3) division (1) **divisions** (9)  
**divs** (4) **do** (3) dock (2) doctor (1) doctoral (1) document (1) **does** (11) doing (1) dominate (1) donald (1) done (2)  
donecheaper (1) **dot** (6) dots (2) **dotted** (7) dougie (1) down (2) downward (1) dr (2) drag (1) drain (1) draper (1)  
drawbacks (2) drdavidforehand (1) drive (1) driven (1) drives (2) **driving** (3) drmaxvasileforhissharp (1) drop (1) drops (1) **dt** (5)  
dual-launch (1) dual-payload (2) dual-pyramid (1) dual (1) **due** (20) duediligencemusttherefore (1) duetomassof (1) duffing (1)  
**dumbbell** (14) dumbbellmodels (1) duplicate (1) duplicating (1) during (2) dynamic (1) dynamical (2)  
**dynamics** (38) e01 (1) e04 (1) e05 (1) e06 (1) **each** (52) earlier7 (1) earlier (2) **early** (5)  
earlyageright (1) earlypioneers (1) earth- (1) earth-based (1) earth-centred (1) **earth-moon** (3) earth-sun-moon (1) earth4 (1)  
**earth** (34) earthr (1) **ease** (9) **easier** (5) easily (2) **eb** (8) eccent (2) eccentricity (2) **eclipse** (13)  
eclipsecheckingfunction (1) eclipsed (1) eclipseseclipse1 (1) eclipses (1) eclipsing (1) economic (1) **ed** (4) edge (1) **edges** (3)  
edu (1) eduardovich (1) **effect** (13) effective (1) **effectively** (6) **effects** (7) efficiency (1) **efficient** (4) effort (1)  
eiden (1) **either** (4) ejected (1) ek (2) elapsed (1) **elastic** (4) electric (1) **electrodynamic** (3) electrodynamics (1)  
elegant (1) element (2) elemental (1) elements (2) **elevator** (5) elevators (2) eliminated (1) ellipse (2) **elliptical** (11)  
emphasise (1) employ (1) **employed** (5) employing (1) **enable** (5) enableperiodic (1) enables (1) enabling (1)  
encounter (1) **encountered** (3) encour (1) encouragement (1) encouraging (2) **end** (13) endanger (1) endeavours (1)  
endpoint (1) ends (1) energetic (1) **energies** (18) **energy** (54) engine (2) **engineering** (6) english (1)  
**enhance** (4) enough (2) **ensure** (8) ensurepoorresultsareentirely (1) ensuring (1) entered (1) enthusiasm (1) enthusing (1)  
**entire** (4) **entirely** (3) entirety (1) environment5 (1) **environment** (6) environmental (1) **ep** (3) ephemeral (1)  
ephemeris (2) epsrc (1) **equal** (14) **equally** (4) equate (1) equation4 (2) **equation** (29)  
**equations** (134) equationsof (2) equatorial (2) **equilateral** (3) equilibrium (1) equipment (1)  
**equivalent** (5) **error** (6) **errors** (8) errortolerantpayload (1) **esa** (5) **escape** (3) **especially** (5)  
essential (2) **essentially** (3) establish (1) estimate (2) **et** (28) etal (2) etc (2) etre (1) european (1) **evaluated** (9)  
evaluatedform (1) evaluates (2) evaluating (1) evaluation (1) even (2) evenly (1) events (1) eventually (1) ever-present (1)  
every10 (1) **every** (5) everyone (1) evolved (1) exacerbates (1) exact (1) **exactly** (7) examination (1) **examine** (3)  
**examined** (8) examines (2) examining (2) examiningthe (1) **example** (13) exampleof (1)  
exampleofthecoplanardumbbelltether (1) examples (2) exceeding (1) **excellent** (3) excess (2) **exchange** (17)  
exchanges (1) exchangetetherperformed (1) excitation (1) excited (2) execute (1) exemplar (1) exert (1) exerted (2) exhaustive (1)  
exhibit (2) exhibiting (1) exhibitssimilarlevels (1) exist (1) existent (1) exists (1) exp (1) **expanded** (7) expansion (1)  
**expected** (3) expended (1) expensive1 (1) experienced (1) experiment (1) experiments (1) expert (2) **explained** (3)  
explanation (2) explicit (1) explored (2) **exponential** (5) expressed (1) expressing (1) **expression** (13)

expressionand (1) **expressions** (4) extant (1) extend (1) extendable (1) extended (1) external (2) extract (1) extrapolate (1)  
extreme (1) extremely (1) extrusion (1) **facility** (62) facilityearth (1) facilityfacilitycom (1)  
facilityfacilitycomyinertialxinertialr (1) facilityfacilitycomylocalxlocalpj (1) facilityfacilityrcom (2) **fact** (2) **factor** (9) factored (1)  
factors (2) facts (1) faculty (1) fails (1) **failure** (4) fair (1) families (1) faq (1) fast (1) faster (2) father (1) favourable (1)  
feasibility (1) feasible (1) feature (1) feed (1) feedback (2) **few** (5) **fibre** (3) fibres (1) fiction (1) **field** (6) fields (1) figures (1)  
**figure3** (3) **figure4** (3) figure6 (1) **figure** (121) figures4 (1) **figures** (34) **final** (7) **finally** (3)  
**find** (6) **finding** (3) findingsof (1) finds (2) **first** (31) firstly (1) firstlybedeployed (1) **firstphase** (3)  
firsttermasthetensionduetothepayload (1) **five** (18) fivemasspointsareused (1) fivetransfersperyear (1) **fix** (1) **fixed** (2)  
fixedfrom1000s (1) flat (1) flatten (1) flaw (1) **flexibility** (3) flexible (2) flexing (1) flexural5 (1) fluctuates (1) flying (1) focussed (1)  
focussing (1) fold (1) folding (1) follow (2) **followed** (6) followedby (1) **following** (15) **follows** (13)  
**for** (214) foracircularorbitand (1) forarotationof (1) foravery (1) **force** (14) forced (1) **forces** (13) **forcing** (4)  
forleotolmo (1) **form** (12) formation (1) former (2) forms (1) formthepayloadarm (1) formulas (1) formulations (1) forperiodic (1)  
forstiffdifferential (1) **forthefivecases** (3) **forward** (6) forwhich (1) forzylon (1) fostered (1) **found** (17) foundation (2)  
fountains (1) **four** (4) **fraction** (3) fractional (1) **fractions** (3) **frame** (4) free (2) **freedom** (4) frequencies (1) frequency (1)  
frequently (1) frequentlyasanend- (1) friction (2) **friends** (3) **from** (105) froma (1) fromesabulletin (1) fromleo (2)  
fromthe (2) fromthecentretotheirs- spans (1) **fuel** (3) fulfil (1) fulfilled (1) fulfilment (1) **full** (8) **fully** (6) **function** (12)  
functionality (1) functions (2) **fundamental** (9) fundamentallyacompressivestructuredescribed (1) fundamentals (1) funded (1)  
furoshiki (1) **further** (11) furthermore (3) furtherstudy (1) future (2) g12 (1) gaas (1) gain (2) gains (1) gdp (1) ge (2)  
gearbox (2) gearmethod (1) **general** (10) **generalised** (28) generalisedco-ordinates (1) **generally** (3)  
generallystablewhereasretrieval (1) **generated** (9) generates (1) generating (1) generation (2) **generic** (3) genesis (1)  
**geo** (3) geometric (2) george (1) geostationary (2) gg (1) giant (1) gimbal (1) **give** (10) **given** (31) givenatotal (1)  
givenby (2) giventhis (1) **gives** (13) **giving** (4) givingconfidencethatthemmetiscapableand (1) glaser (1) **glasgow** (6)  
**global** (4) glossary (1) **goal** (4) gold (1) **good** (6) gorni (1) governed (1) gradient (2) gradual (2) gradually (1) grant (1)  
graph (2) graphical (1) graphics (2) graphs (1) grasp (1) **gravitational** (4) gravity-assist (1) **gravity** (6) **great** (3)  
**greater** (3) greatest (1) greek (1) green (1) griffinandfrench (1) ground (1) grounding (1) groups (2) guarantee (1) guaranteeing (1)  
guidance (1) guide (1) guidelines (1) gyration (1) gyroscopic (1) had (1) **half** (3) halfway (1) halt (1) halves (1) hand-side (1)  
**hand** (8) handover (2) **hanging** (3) hans (1) hard-coding (1) hard (2) hardware (1) hardwareavailable (1) harmonic (1)  
harmonically (1) harpoon (1) **has** (32) **have** (36) having (1) he (2) heat (1) heavily (1) heaviside (1) **height** (4)  
heijden (1) **held** (5) helicopter (1) hemisphere (1) hence (1) her (2) **here** (19) hereby (1) heuristics (2) hexagonal (1)  
hgpa (1) hgpal (3) high-torque (1) **high** (8) **higher** (9) highest (1) highlight (1) **highly** (4) hindmarsh (1) **his** (6)  
history (1) hiten (1) **hohmann** (8) holding (1) hooke (1) hooks (1) horizontal (2) hours (2) housed (1) houses (1) how (1)  
**however** (31) howeveraninedegreeoffreedommodelhasthepotential (1) **hoyt** (5) **hpa** (5) htm (1) http (1) hub (2)  
huge (1) **hyperbolic** (3) hypotenuse (1) hypothesis (1) **i1** (9) itshows (1) **i2** (10) **i3** (19) **i4** (9) **i5** (10) iae (1) ian (1)  
ice (1) icrf (1) **idea** (5) **ideal** (3) idealised (1) idealized (1) **ideaof** (3) ideaofaspaceelevatorwasborn (1) ideas (2) identical5 (1)  
**identical** (12) identically (2) identified (1) identifies (2) **if** (17) ifrequested (1) iftheanglebetweensub-spans1 (1) iftheout-of-  
planemotionofthespace-web (1) ifthetorquewassuddenly (1) ignores (1) illuminated (1) illustrate (1) illustrates (1) illustration (1)

illustrative (3) images (1) imaginedavast (1) immediately (1) impact (2) impacted (1) impactthat (1) impart (2) imparted (1)  
imparting (2) imparts (1) imparttothepayload (1) imperativeto (1) impetusforacademics (1) implemented (1) implications (1) implicit (1)  
implies (1) importance (1) **important** (12) importantly (1) imposes (1) impossible (1) improvement (1) in- (1) **in-**  
**depth** (5) in-keeping (1) in-orbit (1) **in-plane** (21) in-planeangle (1) in-planespin (1) in-planespinrate (1) in1968 (1)  
in1975 (1) in2008 (1) **in** (530) ina (1) inaprogressive (1) inareasonable (1) inarelativelyshorttime (1) inasymmetrical (1) inboth (2)  
inc (1) inchapter4 (1) incircularearth (1) **inclination** (54) inclinationchangeusing (1) inclinationplots (1)  
inclinationtermwillbeexemplified (1) **inclined** (10) **include** (7) **included** (12) **including** (7)  
includingthegemini12 (1) inclusion (1) inconclusive (1) incontrast (1) incontrasttothenonlinearbehaviouroftheangularrotation (1)  
incorporatethefull (1) **increase** (22) **increased** (3) increasedfromzerotomaximum (1) **increases** (5)  
**increasing** (7) increasingthisparameter (1) **increment** (7) indeed (2) **independent** (4) inderivinglagrange (1)  
indicated (2) indicatedirection (1) indicating (2) indirectlyonthissystem (1) individual (2) industrial (1) inelastic (1) inequation5 (1)  
inequation6 (2) inequations5 (1) inertia-less (1) **inertia** (3) **inertial** (55) inertialaxes (1) inertially (1)  
**inertialplane** (3) inertialpositionvectorpinertial (1) inertialx-yplaneand (1) inertialx (1) inertialy-axis (1) inertialy (1) inevitable (1)  
inevitably (1) inextensibletosimplify (1) infigure3 (1) **infigure5** (4) **infigure6** (3) infigures4 (1) infigures5 (1) infiguresb (1)  
inflatable (1) **influence** (9) influenced (1) influenceof (2) influences (1) influencetheyhavemaybeovertakenby (1)  
**information** (3) informative (1) inforstoragemay (1) infrastructure (1) ingenious (1) ingerman (1) inherent (1) ini (1)  
**initial** (70) initialfewminutes (1) **initially** (5) **initialmmetspin-up** (3) injection (1) inmathematicaweresolvedby (1)  
inmathematics (1) inonepolynomial (1) inorbit (1) inordertoascertainthe (1) inorientation (1) inparis (1) inparticular (1)  
inparticularmarilyndunlop (1) inplaneaboutthefacility (1) inradiushasonthetetherapogee (1) **insection3** (3) inserting (1) insight (2)  
insights (1) insofar (2) insofaraspossible (1) inspired (1) instabilities (1) **instability** (4) instantaneous (2) **instead** (6)  
institute (1) insuch (1) **intact** (12) integral (1) **integrate** (5) **integrated** (6) **integrating** (3)  
integratingtheequationsof (1) **integration** (3) integrationproblems (1) integrator (2) intended (2) interact (1) **interaction** (6)  
interactswith (1) interconnected (1) interconnecting (1) interdependence (1) interest (2) **interesting** (8) interfacing (1)  
interference (2) interfereswith (1) interferometer (2) interferometers (1) intermediate (2) intermediatestagearound (1)  
intermsordinary (1) intermsoreleasestrategyforan (1) **internal** (5) international (1) **interplanetary** (3) interplay (2)  
interpret (2) interpreted (2) intersects (1) interview (1) intether (1) **inthe** (4) intheapogeeof (1) inthecalculatiofpotential (1)  
inthecomplotsweregenerated (1) inthecontourgraph (1) intheexpressionforpotential (1) inthefactthatthey (1) intheformof (1)  
intheorderof (1) inthespin-up (1) inthetether (2) inthetetheraregradually (1) inthetetherbody (1) inthetetheris1 (1) inthethreeaxes (1)  
inthex-axisonly (1) inthisassumption (1) inthiscase (2) inthiscasea (1) inthiscaseusing (1) intimately (1) **into** (36) intostraight (1)  
intothe (1) intothedeployment (1) intothefacility (1) intrajjectory (1) introduce (2) **introduced** (4) **introduces** (3) introducing (1)  
**introduction** (5) inunderstanding (1) invalidate (1) inversely (1) **investigate** (4) **investigated** (10) investigates (2)  
investigatetheeffectthat (1) **investigating** (4) **investigation** (5) investigative (1) involves (1) **involving** (4)  
inwhichtheelastictethermodel (1) inziegler (1) **iota** (5) **ipayload** (8) is3 (1) is469 (1) is5 (2) **is** (499) isaacs (1)  
isacceleratedfromzeroveLOCITY (1) isachieved (1) isaconservativeapproach (1) isadded (1) isaligned (1) isamoderatevelocity (1)  
isanerror (1) isanorderof (1) isapproximately6 (1) isaratherarbitrarydecision (1) isassembledfromthevector (1) isassumed (1)  
isassumedtobeconstantalong (1) isastagemorecomplicated (1) isasymmetrical (1) isauseful (1) isbased (1) isbuilt (1)  
iscalculatedusingtheultimatetensile (1) isconcerned (1) isconserved (1) iscoveredfurther (1) isdecelerated (1) isdefined (1)

isdeterminedfromtheclassicalhohmanntrajectory (1) isdiscretized (1) isduetothe centripetal (1) isduetothe differing (1) iseased (1)  
isequal (1) isequivalentto1000km (1) isessentialaspart (1) isexamined (1) isexpandedfurther (1) isexpected (1) isexplained (1)  
isfound (2) isgenerally (1) isgeneratedby (1) ishigherthanthe (1) isloweredby (1) isnecessary (1) **isnot** (3) isolate (1)  
isoneofthese (1) isonlygoing (1) isoutlined (1) isp (1) isplaced (1) ispossibleto describethe motionofthemmet (1) isprimarilyconcerned (1)  
isprojectedontothexy-inertial (1) ispurelyduetothe (1) isreached (1) isreleased (1) isrotated (1) isseveral (1) isshown (2)  
isshownthatdeployment (1) isslowlyretracted (1) isstabilised (1) isstationary (1) isstraightforward (1) issuch (1) issue (1) issues (1)  
issymmetrical (1) isthe (2) istheangle (1) isthedifferencebetweenthe sub-spansdefinedby (1) isthenextrapolated (1) isthenfoundby (1)  
isthenpossibleto separateand (1) isthenrotated (1) isthenrotatedintotheearth (1) istheproduct (1) istherefore (1)  
istheweakstabilityboundary (1) istoprovidethemaximum (1) istrueofthedaughtersatellitemass (1) **isused** (3) isusedbut (1)  
isusedto calculatetheorbital (1) **it** (60) itcouldbearguedthatthisfollowsthearbitrary (1) itdoesnotpresent (1) **itether** (8) itexplains (1)  
ith (1) itisareasonableassumptiontodemonstratetheprinciplesof (1) itisstated (1) **its** (10) **itself** (4) itsoriginal (1)  
itsperformanceand (1) itsroleasareusable (1) iwai (1) iwould (1) izzo (1) j2000 (1) j2 (1) jack-of-all-trades (1) janin (1) **january** (3)  
japanese (1) joanna (1) john (1) journal (1) **jpl** (3) july (1) kamel (1) **kaya** (3) kayaet (2) **keep** (3) **keeping** (3) keiper (1)  
**kept** (3) **key** (4) **kg** (3) kh (1) kindness (2) **kinetic** (20) km (1) kn (1) known (1) konstantin (1) koon (2) koonet (1)  
kraus (1) kth (1) kw (1) kx (1) kyroudisandconway (1) **l1-l2** (4) **l12** (2) **l1** (56) **l21j** (1) **l22** (2) **l22j** (1) **l2** (41) **l2mpayload** (2)  
**l2mtether** (2) label (1) lack (2) **lagrange** (36) **lagrangian** (17) landmark (1) languages (1) largange (1)  
large-scale (1) large-scaleelectrodynamicsandmomentumtransferbetweenplanetswasstudiedin (1) **large** (30) largely (1)  
largenumberof (1) largeout-of-planemotion (1) largeout-of-planemotionthat (1) **larger** (4) largeshuttle (1)  
largespacestructureshavebeenproposed (1) last (1) lastandprogressivelyadetailed (1) lasting (1) late (1) lated (1) **later** (3) lateral (1)  
latin (1) latter (1) laughing (1) **launch** (23) **launched** (3) **launcher** (5) launcherofpayloads (1) launching (1)  
law (1) **laws** (3) lawsareexaminedfordeployments (1) layer (1) **layout** (9) layouts (1) lays (1) **ldamp** (7) **lead** (6)  
leading (1) **leads** (4) leadstoquasi-periodicmotionof (1) learning (1) least (2) leavesthe10kg (1) leaving (1) led (1) left8 (1) left (1)  
lefthand (1) **length** (50) lengthby (1) lengthgeneralised (1) **lengthl1** (3) **lengths** (7) lengthsand (1) lengths of (1)  
lennert (1) **leo** (7) **less** (10) lesser (1) lesspower (1) lessstraightforward (1) lessthanthetethertensionof110 (1) letter (2)  
**level** (8) **levels** (4) levin (2) **li** (6) libratealong (1) **librating** (4) librationandrotation (1) librations (1) lies (1) **life** (6) light (1)  
lightenthecomputationalload (1) **lighter** (3) **like** (11) likelihood (2) **likely** (9) likelyto causesignificantproblems (1)  
liketothank (1) likewise (1) **limit** (4) limited (1) limitedby (1) **limiting** (5) **limits** (9) limitthenumberofgeneralised (1)  
limitthetether (1) **line** (16) **linear** (22) linearkineticenergy (1) linearly (2) linearlytoamaximumtorque (1)  
lineartetherrecoveryprofile (1) lineisapproximately0 (1) linejoining (1) lines (2) linesduetothe tensioncreated (1) link (1)  
linkbetweenpayload (1) linked (1) linking (1) **links** (3) **list** (3) **listed** (4) **literature** (5) literatureandgivesanoverviewof (1)  
literatureinthepast (1) little (1) livegraphics3d (1) livingston (1) lj (1) lmass (2) **lmed** (3) ln (1) lo (2) load (1) loading (1)  
**local** (65) localbody-centred (1) localcoordinatesystem (1) **localj** (4) localparameters (1) localposition (1) localpositionof (1)  
localpositionvectormaybeafunctionof (1) **localz** (1) **located** (5) **location** (6) **locations** (5) locationsof (1) lock (2)  
logical (1) logicallyevaluatetheright (1) long-term (2) **long** (4) longer (2) longitudinal (1) looking (1) **loop** (5) **lorenzini** (7)  
losing (1) lost (1) love (2) low-cost (1) **low** (5) **lower** (11) lowered (1) lowering (2) lowmarsorbit (1) lpay (1) lpayload (2)  
**lpcom** (5) lpxlocalfacility (1) **lrec** (6) lumped (1) **lunar** (21) lunarcapture (1) lunarsurface (1) lunavator4 (1) lunavator (1)  
lying (1) lylocalinertialxlocalcomradius (2) **m1** (22) **m2** (34) **m3** (6) ma (1) **made** (8) **magnitude** (13)



**main** (6) mainly (1) maintaining (1) major (1) majorgravitationalbody (1) majority (2) **make** (5) makes (3) making (2)  
manageable (2) manipulating (1) manipulation (1) mankind (1) **manner** (3) manoeuvre (1) manoeuvres (1) manufactured (1)  
manufacturing (1) **many** (17) margin (1) marginal (1) marginally (3) margins (1) mark (1) marked (1) **mars** (5)  
martinator (1) mass-based (1) mass-point (1) mass1 (2) mass2 (2) mass3 (2) **mass** (227) massarederived (1)  
masscalculations (1) massdistribution (1) masses1 (1) **masses** (33) massesof (2) massfor (1) massforthetether (1)  
massfrom (1) massfromthefacility (1) massive5 (1) **massive** (4) massivebody (1) **massless** (5) masslesselementsand (1)  
massmodelling (2) massmovement (1) **massof** (3) massonmaximumcom (1) **masspoint** (4) **masspoints** (5)  
masspointshavebeendefined (1) masspointstoconsiderforafine-grainweb (1) masswillheed (1) match (2) matched (2) matching (1)  
**material** (8) materialproperties (2) materials2 (1) materials7 (1) **materials** (4) mathematica11 (1)  
**mathematica** (16) **mathematical** (11) mathematically (1) mathematics (2) mathieu (1)  
**matrices** (10) matrix2 (1) **matrix** (11) matrixthengives (1) matter (1) matthew (1) **max** (6) maximise (2)  
**maximum** (28) maximumcom (1) maximumearly (1) **may** (54) maybefoundin (1)  
maybothbegainfullyemployed (1) maylead (1) mayprovide (1) mccarthy (1) mcinnes (3) **mckenzie** (6) mclaughlin (1) me (2)  
**meaning** (3) meaningful (1) **means** (5) measured (1) mechanical (2) **mechanics** (4) **mechanism** (3) medium (1)  
**membrane** (5) mentally (1) mention (1) mentioning (1) mentions (1) **meo** (3) merely (2) meshing (2) metaphorically (1)  
**method** (23) methodfordescribing (1) methodology (2) **methods** (3) methodsof (1) metres (1) metrics (1)  
**mfacility** (28) mhuh (1) **mi** (10) micro-meteorites (1) **micro-satellite** (4) microwave (1) mid-point (1) mid-term (1)  
midpoint (2) midpoints (2) millerandbelbruno (1) mind (1) minerals (1) **minimal** (3) minimise (2) **minimised** (4)  
minimisestheaction (1) minimising (2) **minimum** (3) minor (2) mirror (1) mismatch (1) misra (2) misraandmodi (2)  
**mission** (18) **missions** (5) mistake (1) mitigate (2) mitigation (1) mivi (1) mixi (2) miyazaki (1) miyi (2) mizi (2)  
**mj** (11) **mmet** (74) mobile (1) mode-locking (1) mode (1) **model** (59) modelasthebasisforthe (1)  
**modelled** (9) **modelling** (19) modellingthefrictionproperties (1) **models** (9) moderate (2) modes (1) modest (2)  
**modi** (5) modulates (1) modulation (1) module (2) **modules** (4) momentarily (1) momentum-enhanced (1)  
**momentum** (25) momentumexchange (2) momentumexchangetethers (1) monotonic (1) **month** (3)  
**moon** (15) **moravec** (3) moravecpublished (1) **more** (25) moregenerally (1) moremassontheoutsideof (1)  
**most** (11) **motion** (69) motionaresolvedforthefollowinginitial (1) motionfor10 (1) motionfor (2) motionforrecovery (1)  
motionof (1) motionprovideaconstant (1) **motions** (8) **motor** (31) motorised (2) **motorized** (4)  
motorrequiredtoeelthetether (1) motortorque (1) **move** (4) moved (1) **movement** (25) movementcausetheroot (1)  
**movements** (5) moves (2) **moving** (12) mpay (1) **mpayload** (17) mrobot- (1) mrobot3 (1)  
**mrobot** (9) msat (6) **mtether** (55) mtotal (7) **much** (5) multi-parameter (1) multi-staged (1) multi-  
strand (1) multi-tethered (2) **multiple** (7) multiples (1) **multiplication** (4) **multiplied** (3) multiply (1) multiplying (2)  
multitude (1) mum (1) **must** (24) mustbetranslatedfromthe (1) musthavetheoutof- (1) mutual (1) mv2 (1) **mw** (8) mweb- (2)  
**mweb** (5) mwl (1) mxer (2) **my** (6) n-body (2) nakano (2) nakasuka (1) name (1) named (1) nano-satellites (1) narrowest (1)  
nasa (1) nations (2) naturally (1) nature (1) nayfeh (1) **ndsolve** (8) near (2) necessarily (1) **necessary** (6)  
necessitates (1) necessitating (1) necessity (1) need3 (1) **need** (3) **needed** (8) needless (1) needs (1) **negative** (10)  
neglected (1) net-likestructurecould (1) **net** (7) network (1) never (1) **new** (10) newcomer (1) newtonian (2)

newtonianderivation (1) **next** (3) night (1) nine (1) ninth (1) nitrogen (1) nm (2) **nm-tether** (6) nn (2) **no** (12)  
noandcochranjr (1) nodes (1) nomenclature (1) nominally (2) nominalorbitalperiod (1) non-conducting (1) non-conductive (1) **non-conservative** (15) **non-conservativeforces** (3) non-dimensional (1) non-identical (1) non-planar (1) non-rigid (1) **non-rotating** (5) non-specialists (1) non-stiff (2) non-trivial (1) non-zero (2) **nonlinear** (4) nonlinearly (1)  
nontrivial (1) nor (1) normal (2) normally (1) **not** (52) **notable** (3) notation (1) **note** (7) notewell (1) nothing (1)  
noticeable (1) notions (1) **notto** (1) **nottoscale** (1) novel (2) **novelideascanfourish** (1) **now** (5) nth (1) **number** (9)  
**numerical** (19) numericalintegrationtechniques (1) **numerically** (11) nutation (2) obeying (1) object (1)  
observed (2) obtain (1) **obtained** (5) obtainedby (1) obvious (1) obviously (1) occupy (2) occur (1) occurs (2) **october** (1)  
ode (1) odes (1) of-plane (1) of18 (1) of1 (2) of1kg (1) of27individual (1) of35000 (1) of5years (1) of69376s (1) **of** (1037)  
ofdeploymentwouldbeuncontrolled (1) ofeach (1) offer (1) office (1) **offset** (3) offsets (1) offshoots (1) ofgeneralised (1)  
ofgravitygradient (1) ofground (1) ofheavenlybodies (1) ofmotion (1) ofposition (1) ofsuch (1) often (2) oftethers (1) **ofthe** (3)  
ofthecomfortherecovery (1) oftheearth (1) ofthescientificmethodtoset (1) ofthetether8 (1) ofthetether (1) ofthetethersarereduced (1)  
oftime (1) ofzylon (1) omez (1) **on-orbit** (3) **on** (92) onaseriesofz-axis (1) **once** (8) oncethenet (1) oncetheposition (1)  
oncethispoint (1) one-dimensional (1) one-g (1) one-line (1) **one** (28) onehalf (1) oneof (1) oneofthestrengthsofthemmetis (1)  
onerous (1) onesaros (1) onfurther (1) online (1) **only** (12) onorbit (1) onpayload (1) onsub-span1 (1) onsub-spans1 (1)  
onthefactorial (1) ontheorderof1 (1) onthepayload (1) ontheprobability (1) onthespace-web (1) ontheweb (1) onthewebiscalculated (1)  
onto (2) open (1) openhub (1) opening (1) opens (1) operating (2) operation (2) operations (1) opportunity (1) opposed (1)  
**opposite** (7) optical (1) optimal (2) optimised (1) optimising (1) option (2) or20 (1) **or** (43) ora (1)  
oraccelerationtothetether (1) oranactivecontrol (1) orbit7 (1) **orbit** (73) **orbital** (53) orbitaldebris (1) orbitfrom (1)  
**orbiting** (3) orbitornot (1) orbits12 (1) **orbits** (9) orbitsexclusively (1) orbitsorbits (1) orbitthrough (1) orbitwith (1) ordamping (1)  
**order** (15) orderof (1) orders (1) ordersof (2) ordinates (1) **origin** (11) **original** (8) originated (1) orless (1)  
orlunarelevatorsmaybe (1) orthogonal (1) ortranslated (1) oscillation (1) **oscillations** (3) oscillator (2) oscillatory (1)  
**other** (19) otherproblemsthatplaguetheresearcher (1) others (2) otherwise (2) oursmallparty (1) out- (1) **out-of-plane** (29)  
**plane** (29) out-poweredby (1) **out** (10) outcome (1) outer (1) outline (1) **outlined** (20) outlines (2)  
outperforms (1) **output** (3) **outside** (4) outwards (1) outweighs (1) over-complicating (1) **over** (17) **overall** (4)  
overcoming (1) overlaid (2) overlooked (2) overly (1) overthe (1) **overview** (3) overviewof (1) own (1) **p0** (22) p112 (1)  
**p175** (3) **p1** (20) p2 (2) p3 (2) p43-45 (2) p4 (2) p5 (2) p71 (1) **package** (3) pairing (1) panel (1) **paper** (4) papers (2)  
parabolic (1) paradise (1) parallel (2) parallels (1) **parameter** (7) **parameters** (17) parametric (2)  
parametrically (1) parsons (1) part (2) partial (1) **particular** (3) particularly (1) partly (2) parts (1) **pascal** (4) pascual (1)  
passive (2) past (1) **patch** (4) patched (1) **path** (9) **paths** (4) patience (1) pattern (1) pausegaming (1) paying (1)  
**payload** (83) **payloads** (21) pc (1) pcom (2) pearson (1) **pendulum** (5) **per** (4) perfect (1)  
**perfectly** (3) perform (1) performance (4) **performed** (8) **perhaps** (5) perhapsoneof (1) **perigee** (3)  
perimeter (1) **period** (4) periodic (1) periodically (1) periods (2) permanently (1) permutations (1) perpendicular (1) pertinent (1)  
**perturbations** (4) peterglaser (1) petzold (1) **pfacility** (6) pfinal-yz (1) pfinal-zy (1) pfinal1 (2) **pfinal** (7) **ph** (3)  
**phase** (45) **phenomenon** (3) philosophy (1) phones (1) physical (2) physics (1) **pi** (5) picks (1) piinertial (2)  
**pilocal** (5) pinter-yz (2) pinter-zy (2) pioneers (2) pitch (1) pizarro-chong (1) **pi** (22) piinertial (1) pjlocal (1) pjxlocalfacility (1)

place (2) placed (1) places (1) placing (1) **planar** (5) plane9 (1) **plane** (40) planes (1) planet (1) planetary (2)  
planned (1) plans (1) plateaux (1) **platform** (6) played (1) plentiful (1) **plot** (16) **plots** (32) plotted (1) **pmass** (3)  
pob (1) point10 (1) **point** (57) points3 (1) **points** (21) pole (1) political (1) politicianswantdevelopmentsfaster (1)  
porbit (1) **porig** (8) portion (1) poses (1) **position** (43) **positional** (4) positionaligned (1) positionareshown (1)  
positionequations (1) positionof (1) **positions** (11) positionsof (1) positive (2) possibility (2) **possible** (14) post-  
capture (1) postulating (1) **potential** (28) potentially (1) **power** (13) powered (1) **ppayload** (9) pr (1)  
**practical** (4) practically (1) pragmatic (1) pre-defined (1) pre-deployed (1) precautions (1) precisely (1) precision (1)  
precisiongoal- (1) precisiongoal (2) predictable (1) predicted (1) predominantly (1) preference (2) presence (2) present (1)  
presented (1) press (1) **previous** (6) **previously** (7) primarily (2) primary (1) principle (1) principles1 (1) principles (2)  
probe (1) **problem** (6) **problems** (4) procedures (1) **process** (5) produce (2) produced (1) **product** (4) prof (1)  
**profile** (8) **profiles** (3) progress (1) progression (1) progressive (2) projected (2) propellantless (1) **properties** (6)  
propertiesof (1) propertiesofgemotor5bc49jb1115 (1) proportion (1) **proportional** (8) **proposed** (9)  
**propulsion** (5) propulsionstogtoandearth (1) **provide** (13) provideanexcellentlagrangianformulationfor (1)  
**provided** (10) providepower (1) **provides** (4) **providing** (5) psi (2) psidot (2) **ptether** (4) publication (1)  
**published** (3) purely (2) **purpose** (3) purposes (1) puzzle (1) **qi** (3) **qj** (20) qualitatively (1) quantify (1) quarter (1)  
quaternions (2) question (1) quickly (1) **r2** (36) **rad** (44) radial (1) radians (1) radiation (1) radius11 (1) **radius** (28)  
radiusvectors (1) raises (1) raisesthepayload (1) raising (1) raison (1) raj (1) **range** (4) rapid (2) rapidly (2) rarely (1) **rate** (12)  
rated (2) rather (1) rating (1) ratio (2) ratios (1) re- (2) re-assess (1) re-launched (1) re-usability (1) re-usable (1) re-use (1)  
reached (1) reaches (1) reaction (1) readable (1) reading (1) ready (1) **real** (5) realignment (1) realisable (1) realised (1)  
realities (1) reality (1) **rearth** (3) reason (1) reasonable (1) reasons (1) reboot (1) recently (1) recentlycreated (1)  
rechargebatteries (1) recommendations (2) recommended (1) reconfigurable (1) reconfiguration (2) **reconfigure** (4)  
reconfiguretheweb (1) reconfiguring (1) recover (2) **recovered** (3) **recovering** (6) **recovery** (40)  
recoveryphase (1) recoveryprofile (1) rectangular (1) rectenna (1) rectum (2) red (2) **reduce** (6) reduced (1) reduces (1)  
reducing (2) redundancy (1) **redundant** (3) **reel-in** (3) reel-out (1) **reel** (6) reeled (1) **reelin** (6) reeling (1) reels (1)  
reference3 (1) **reference** (4) references (2) referred (1) refertoallother (1) refertotether (1) refined (1) refinement (1) refines (1)  
refining (2) **reflect** (4) reflecting (1) reflects (1) regime (1) region (1) reinforcesheearlier (1) related (1) **relationship** (9)  
**relative** (5) **relatively** (6) **release** (32) releaseachieving (1) **released** (3) relevant (2) relies (1)  
**remain** (6) remainder (2) **remaining** (3) remains (2) remarked (1) remedy (2) remote (1) remove (1) removed (1)  
removing (1) rendering (2) **rendezvous** (4) rendezvousof (1) renewable (2) **repeatable** (3) repeatably (1) **repeated** (3)  
replaced (2) replicated (1) **report** (4) **reported** (3) reportedby (1) represent (1) representation (1) **representative** (4)  
**represented** (4) representing (2) represents (2) representstheposition (1) reprinted (1) require (2) **required** (14)  
requiredbythe (1) requirement (1) **requirements** (4) **requires** (9) res-in (1) **research** (12) researchers (2)  
resistancetoensurethetether (1) resonance (2) resonant (1) **respect** (9) **respective** (3) **respectively** (5)  
respecttothefacility (1) response (1) rest (1) restricted (1) **result** (12) resultant (2) **results** (15) retaining (1) retiring (1)  
retracted (1) retracting (2) retractionspeed (1) **retrieval** (3) retrievals (1) return (1) returns (1) **reusable** (3) revealed (1)  
reveals (1) **review** (4) reviews (1) rhys (1) right- (1) right-angles (1) **right** (9) rightjob (1) righttoolforthe (1) rigid11 (1)

**rigid** (15) rigidize (1) rigidly (1) rigorously (2) rise (1) rises (1) **risk** (7) roadmap (1) roads (1) **robot** (37)  
robotcrawl (1) robotinertial (1) robotmass (1) robotmassonmaximumcom (1) robotpaths (1) robotpositionmodelling (1) robots1 (1)  
robots2 (1) **robots** (25) robotx (2) roboty (2) robotz (2) **rocket** (4) rod (1) role (1) roles (1) roll (1) root (1) ross (2)  
**rotate** (4) rotated1 (1) rotated (4) rotates (5) **rotating** (36) **rotation** (99)  
**rotational** (38) rotationalbraking (1) rotationinertial (1) rotationmatrixby (1) rotations10 (1) rotations9 (1)  
**rotations** (58) rotationsabouttheyz-andzy-axes (1) rotationsequenceforyzrotationwithininclination (1) rotationsin3d (1)  
rotationssummary (1) rotationsystem (1) rotationsystems (1) **rotor** (3) rotordynamics (1) round (1) rounding (1) roundthe (1) route (1)  
routine (1) row (2) rows (1) royal (1) rrr (1) rshadow (2) **rsun** (8) rules (1) **runs** (7) s-1 (1) **s2** (3) safely (1) **safety** (5)  
safetyfactor (1) said (1) sails (2) **same** (5) **sample** (3) sanity-checking (1) saros (2) **satellite** (26) satellitering (1)  
**satellites** (4) satisfied (2) savings (1) say (2) sbehaviour (1) scale (1) scaled (2) scales6 (1) scales (2) scaling (1)  
**scenario** (5) scenariosthat (1) science (1) scientific (1) scientistswanttodobetter (1) sclocks (1) scope (2) scotland (1)  
seasons (1) seclipticplane (1) **second** (12) secondary (1) **secondphase** (3) **seconds** (4) section8 (1)  
**section** (24) sectional (1) sectionoftether (1) sections (4) **see** (9) seed (1) seeingtheeiffeltower (1) **seem** (3)  
seemstohavegained (1) seen (2) seesection2 (1) selected (2) selecting (2) selection (2) semi-latus (2) semi-major (1) send (2)  
sense (2) sensitivity (2) separate (1) **separated** (7) separately (1) separating (1) **separation** (6) **sequations** (4)  
sequationscontaintermsforthe (1) sequationsforthisspace-web (1) sequationswillnowbederivedforthesystem (1)  
**sequence** (22) sequenceof (1) sequences (1) sequentially (3) **series** (11) seriesof (1) serious (1)  
servetocomplete (1) **set** (11) **sets** (9) setting (2) settle (1) **several** (12) severed (1) severing (2) severs (1) sf (2)  
sfair (1) **shadow** (4) shall (1) shape (2) share (1) sharing (2) sharp (1) shoots (1) short-term (1) **short** (7) shorttime (1)  
**should** (9) **show** (13) showed (2) showing (4) **shown** (74) **shows** (22)  
showstheprogression (1) shuttle-based (1) shuttle (2) **side** (9) sidesof (1) significance (1) **significant** (11)  
**significantly** (7) **similar** (13) **similarly** (8) similarlytoequation6 (1) similartothe (1) similartothetensiongraphs (1)  
**simple** (9) simpler (2) simplicity (1) **simplified** (5) simplifies (1) simplify (1) **simplifying** (4) simplifyingassumptions (1)  
**simply** (3) **simulated** (3) simulating (2) **simulation** (8) simulations (1) **simultaneously** (3) sin-1 (1) sin2 (1)  
**sin** (121) **sina** (10) since (1) single-strand (1) **single** (9) singularities (4) singularity (3) **six** (3) **size** (3)  
sized2cmx4cm (1) **sized** (3) sizing (1) skip-rope (1) skyhook3 (1) skyhook (2) slight (1) **slightly** (4) slightlybeforepayload (1)  
slow-down (2) **slow** (2) slowed (2) slower (1) **slowly** (3) **slr** (3) **small** (33) smalldifference (1) **smaller** (4)  
**smooth** (6) smoothly (1) **so** (5) social (2) soft (1) software (1) **solar** (16) **solid** (9) soliman (1)  
**solution** (13) solutions (10) solve (4) **solved** (12) solver (4)  
solverhasgreatdifficultiesinintegratingtheequations (1) solvesagreat (1) solving (3) **some** (6) **sorensen** (7)  
sothecentre (1) sounding (1) **source** (6) sources (1) space-or (1) **space-web** (47) space-webdynamics (1)  
**space-webs** (14) **space** (44) **spacecraft** (12) spacecraftbus (1) spacecraftsizing (1) spaced (1)  
spaces (1) spacestructures (1) spacing (2) span (1) spans (2) spatial (1) speaking (2) specialists (1) **specific** (3) specifically (1)  
**specified** (3) specify (3) **speed** (12) speeds (1) spent (1) sph (1) **spiderbots** (3) spike (1) spin-plane (2) spin-  
rate (1) **spin-up** (24) spin-upjust (1) **spin** (18) **spinning** (11) spins (1) spiral (1) spirals (1) spirit (1)  
split (2) splitting (1) spoke (1) spool-out (1) spoolsoutthetetherwithfrictionforcesproviding (1) springenergies (1) spurious (1)

square (8) **ss** (6) sseminalbookon (1) sstudent (1) **stabilisation** (5) **stabilise** (6) stabilised (1) stabilising (2)  
**stability** (29) **stable** (9) staff (1) **stage** (10) stagebuildsonthe (1) **staged** (6)  
stagerecoversthetethersclose (1) **stages** (3) **staging** (5) **standard** (4) stanford (1) **start-up** (3) **start** (4) started (1)  
**starting** (11) startingpointforfurther (1) **starts** (2) **state** (3) stated (2) statement (1) static (1) station (1) **stationary** (3)  
**statistical** (7) statistically (1) **stator** (13) stellar (1) step-change (1) step-increases (1) step (2) **steps** (9)  
stiffness (1) **still** (3) stops (1) storm (1) straight (1) straightforward (1) strand (1) strands (1) strategy (2) **strength** (10)  
strengthened (1) **strengths** (3) stress-minimisation (1) **stress** (46) stresses (2) stressintether (1) **stresss** (3)  
stresswith (1) stretch (1) stretched (1) stringent (1) stripped (1) stronger (1) strongest (2) strongly (2) **structure** (19)  
structured (1) **structures** (7) structuresbuilt (1) structuresinspace (1) structurestretching (1) **studies** (4)  
studieshavepreviouslyshownthat (1) **study** (13) studying (2) sub-span1 (1) **sub-span** (18) **sub-**  
**spans** (21) sub (1) subjecting (1) submitted (1) subroutine (1) subscripts (1) subsequent (2) subsequently (1)  
subsequentpaper (1) substitution (1) **successful** (3) **successfully** (5) successfullydeployed (1) **such** (23)  
suffer (1) sufficient (1) sufficiently (1) suggested12 (1) suggested (1) suit (1) suitable (2) suitableforuseasareusable (1) suited (1)  
suits (1) **sum** (8) summarise (1) summarised (1) summarisedfordifferent (1) summarises (1)  
summarisetheperformanceexpectationsofhanging (1) summary (1) **summed** (6) summing (1) sums (1) **sun-earth** (3)  
**sun** (5) sunlight (1) superimposed (2) supervision (1) **supplied** (4) supply (1) support (2) supporting (1) **surface** (10)  
surprisingly (1) susceptible (1) sustain (2) swarm (1) sweden (1) sweetster (1) swinging (2) switchesbetween (1) switching (2)  
sym (1) symbol (1) symmetric (2) **symmetrical** (18) symmetricaldumbbelltether (2)  
symmetricaldumbbelltetheronacircularorbit (1) symmetrically (2) symmetricpayloads (1) symmetry (1) synchronisation (2) system2 (1)  
**system** (220) systematicallydescribestheproblems (1) systemmassof10 (1) systemof (1) systemonthepayload (1)  
systemparameters (1) systempath (2) systems8 (1) **systems** (32) systemwasfound (1) szebehely (1) **table** (16)  
tables (1) tail-nose (1) tail (1) **take** (3) **taken** (10) takenfrom (1) takes (2) **taking** (7) talents (1) tangling (1) taper (1)  
**tapered** (3) tasked (1) tasks (2) taut (1) **td** (6) teaching (1) technical (1) technicalities (1) technique9 (1) **technique** (6)  
**techniques** (7) technologies (1) **technology** (4) telescopes (1) template (1) temporal (1) ten (1) **tend** (4) tends (1)  
**tensile** (4) **tension** (38) tensionand (1) **tensiont** (3) **term** (17) termasthetension (1) termdominates (1)  
termed (2) terminology (1) terms10 (1) **terms** (24) terrestrial (1) test (2) **testable** (3) **tested** (3) testing (2) tests (1)  
tether-based (1) tether2 (1) **tether** (333) tetherbased (1) tetherbraking (1) tethercomprising (1) tetherconcepts (1)  
tetherderived (1) **tethered** (4) tetheredplatformsand (1) tethererroranalysis (1) tetherfundamentals (1) tethermodelling (1)  
tetheronaninclined (1) tetherreleaseaiming (1) tetherrotations (1) **tethers** (112) tethersare (1) tethersas (1)  
tethersremain (1) tetherswithinclination (1) **tethertension** (9) text (1) textbook (1) **than** (18) **thank** (9) thankful (1)  
thankfully (1) **that** (127) thatformostconfigurationsof (1) thatfulfil (1) thatpioneered (1) thattheendsof (1) thatthefuel (1)  
thatthemassesactatdistance (1) **the** (2256) the3 (2) theagena (1) theapogeewhenthepayloadisreleased (1)  
thearrowsusedto (1) theattainability (1) theauthorsmakethevery (1) theaverageangularvelocityofthethreesub-spans (1) thebraking (1)  
thecaseswith (1) thecentre (1) thecentreof (2) thecentreofmass (1) thechoiceof (1) thecom (1) theconceptof (1) theconfiguration (1)  
thecontoursareshadedfrom (1) thecoolingisprovidedby (1) thecornermasses (1) thecross-sectional (1) thecsa (1) thedeployment (1)  
thedeploymentcharacteristicsof (1) thedestabilisinginfluencesof (1) thedestinationastheearth-sunl1point (1) thediagram (1)

thedifferenceintetherlengthsareminimal (1) thedifferenceof (1) thedifferenceoftheapogee (1) thedifferences (1) thedirection (1)  
thedirectiongivenbythe (1) thedisc (1) thedistance (1) thedotproduct (1) thedual (1) theearth (1) theeffectsthat (1) theend (1)  
theequal (1) theequations (1) **theequationsof** (4) theexpressionforpotential (1) **thefacility** (4) thefacilityby (1)  
thefastertherobotstravelled (1) theforce (1) theforcevectorexpressed (1) thefullrotationsequence (1) **thegeneralised** (3)  
thegeocentricplane (1) thegraphs (2) thegraphshereareevery (1) thegravity (1) thegreaterthe (1) theground (1) thehard (1)  
thehardwarerequired (1) thein-planeangleswillbedefined (1) theinclinationvariable (1) theintentionoffimiting (1) **their** (14)  
theircapability (1) theirfundamental (1) thejerk (1) thejoys (1) thejplhorizons (1) thekinetic (2) thelagrangianenergy (1) thelocal (1)  
thelunavator (1) **them** (3) themagnitude (1) themain (1) themasseswith (1) themaximumallowablestress (1)  
themaximumallowablestressgivesanabsoluteceilingtothestresses (1) themaximumcalculated (1) themaximumcomdisplacement (1)  
themaximummovement (1) themaximumorbital (1) theme (1) themidpointofthesub-spanendsandthe (1) themission (1) **themmet** (4)  
themomentofinertiaof (1) themomentumexchangedevice (1) themostinteresting (1) themotorizedmomentumexchangetether (1)  
themotortorqueshowninfigures5 (1) themselves (1) **then** (46) thenasamxerprogram (1) thenon-conservativeforcesforthe (1)  
thenperforms (1) thenthecentreof (1) thenthey-axis (1) thentworotationsaboutthe (1) thenumber (1) thenumerical (1) theobjectiveof (1)  
theorbitallength (1) theorbitalparameterstocreateanunsteady (1) theorbitalpath (1) theoriginpoint (1) theory (2) theotherbody (1) theout-  
of-planeanglegivenby (1) thepath (1) thepathways (1) **thepayload** (7) thepayloads (1) thepayloadwill (1) theplane (1)  
theplots (1) theposition (2) thepositionof (1) thepossibility (1) thepower (1) thepowersuppliedby (1)  
thepowertothemotorwillonlybeavailableduring (1) theprevious (1) theproblemof (1) theprocess (1) theprocessoffaddingthe (1)  
**there** (22) thereafter (2) thereare6possiblecombinations (1) thereareafewfundamental (1) **therefore** (26)  
therelative (1) theremaining (1) thereof (1) theresultant (1) thereverse (1) therobot (2) therobotand (1) therobotpositionvector (1)  
therobotsareconsidered (1) therotatingtether (1) therotationandlength (1) therotationandlengthgeneralised (1)  
therotationsarepurelybased (1) therotationsof (1) therotationsystemthatrotatesthepoint (1) therotors (1) thesame (1)  
**these** (26) thesecond (2) theseother (1) thesinglebiggestdriverof (1) thesinglemasspoint (1)  
thesinglerepresentativemasspoint (1) **thesis** (15) thesolar (1) thesolarcellsarecurrently (1) thesolutiontotheequations (1)  
thespace-web (1) thestaffatesaactfortheopportunity (1) thestarting (1) thestressand (1) thesub-span (2) thesun (1)  
thesymmetriccentre (1) **thesystem** (3) thesystemcan (1) thesystemparametershave (1) thetechnique (1) thetensionandstress (1)  
**thetether** (14) thetetherarmsareassumed (1) thetetherduetospacedebris (1) thetetherfallsongeometric (1)  
thetetherpayloadsrotate (1) thetethersand (1) thetethersareassumed (1) thetethersboth (1) thetethershouldthepayloadsrigidlyand (1)  
thetetherspreviously (1) thetetherssuch (1) thetethersystem (2) thetethertension (1) thetetherto (1) thetextbookbymcinnis (1)  
thethreerotationsgivenhere (1) thethreesubspans (1) thetimetaketodeploythenrecoverthetetheris69376 (1) thetimethefacility (1)  
thetransferrateof (1) thetranslationalkineticenergy (2) thetriangularspaceweb (1) thetwopayload (1) thetwopayloads (1) theuts (1)  
**theweb** (7) thewide (1) thewsb (1) thewsbtrajectoriesareanumbrellaforamultitudeofpossibleroutes (1) thex-axis (1) **they** (17)  
theyz (1) thez-axisthrough (1) theyy (1) thin (1) things (1) third (1) **this** (198) thisassumptionbuilds (1) thisasymmetry (1)  
thiscan (1) thisconcept (1) thiscriteriaforrelease (1) thisdiffersfromtheyyx (1) thisenablestetherstoseverthe (1) thisis (1) thismaynot (1)  
thispaper (1) thisvector (1) thiswould (1) thorough (2) thoroughly (1) those (1) **thought** (4) thoughts (1) thousand (1) three-  
angle (2) three-dimensional (2) **three** (20) threshold (1) **through** (30) throughgreen (1) throughout (1) thrust (1)  
thruster (1) **thus** (3) tial (1) tibert (1) tilt (1) time-history (1) **time** (116) timeforthe fivecases (6) timespan (1)  
timing (1) tip (2) **tlin** (6) to10s (1) to4 (1) **to** (603) toabreak (1) toacceleratethetethertoreleasevelocity (1)  
toascertainthetether (1) toasmallrotational (1) toavery (1) toavoidtheproblemofinitiallyover-accelerating (1) tobe (1) tobecalculated (1)

toberigidand (2) togethe (1) tocasesi2 (1) today (2) todebrisdamage (1) todescribeasystem (1) todistributeevenlyalong (1) toenglish (1)  
toensurethesafedeploymentof (1) toensurethesaferecovery (1) togain (1) together (2) togive (1) tohaveonecommonangularvelocity (1)  
tohereas (1) tolerant (1) tolunarparking (1) tomakeboth (1) tomaximisethebenefit (1) tonnes (1) too (2) tool (1) tools (1) top (1)  
topayload (1) toperformthede-spinisalargebraking (1) topics (2) toprovideameansof (1) toquantify (1) torotatethetether (1)

**torque** (33) torquemax (1) torquemodel (1) tosimpify (1) tosolvefullsetoflagrange (1) tostopfastdeployment (1) tostudy (1)  
tosuitthemissionorenvironment (1) **total** (10) totalling (1) totalusefulpower (1) totension (1) **tothe** (4) tothepayloads (1)  
tothetether (1) totransfer (1) touches (1) touching (1) **towards** (3) tower (2) toworsenwithbetteraccess (1) tpayload (2)

traditional (1) training (1) **trajectories** (4) trajectory10 (1) **trajectory** (15) trajectoryproposed (1) **transfer** (8)  
transferrateof (1) transferred (2) transferredfrom (1) **transfers** (4) transform (1) transient (2) transients (1) transition (1)

**translated** (3) **translation** (8) translational (1) **translations** (3) transmission (1) transparent (1) transport (1)  
transverse (1) **travel** (3) treated (2) **treatment** (4) trend (1) trends (1) **triangle** (4) **triangles** (3) triangular (2)  
trigonometric (1) trigonometry (1) triplet (1) trivial (1) **trot** (13) **true** (5) tsiolkovski (1) tsiolkovsky (2) tt (1) **ttrans** (11)

twist (1) two-burn (2) two-stage (1) **two** (49) **type** (3) uk (2) ultimate (1) ults (1) un (1) **unacceptable** (3) unaffected (1)  
uncontrolled (1) **under** (8) undergo (1) undergoing (2) undermotorpower (1) underpin (1) underpinning (1) understand (1)  
undertake (1) undertaken (2) undoubtedly (2) uneven (1) unevenly (1) unevenmass (1) unexpected (1) unfortunate (1)  
unfortunately (2) uniform (1) **unique** (3) uniquechallengesforthe (1) uniqueness (1) unit (1) **university** (6) unknown (2)  
unknowns (1) unless (1) unlike (1) unobstructed (1) unperturbed (1) unsatisfactory (1) **unstable** (6) unsym (4) untested (1)

until (4) **up** (17) upfromtheground-testsof (1) upper (1) uppermost (1) **use** (5) **used** (32) usedasthe (1)  
**useful** (12) usefully (2) **usefulness** (3) usefulpayload (1) **uses** (6) usethe (1) **using** (51) usingtheparallel (1)  
ussr (1) **usually** (4) utilises (1) uvel (2) vacuum (2) **valid** (3) validate (2) **validated** (5) validatethese (1) **validating** (3)  
validation (2) validfor (1) valuable (2) **value** (5) valueproblems (1) **values** (5) valverde (1) van (1) vanderheijden (1)

**variable** (4) **variables** (8) variablesandderivation (1) variance (2) **variation** (3) variations (1) varied (1) varies (2)  
variety (2) **various** (3) vary (1) **varying** (8) vasile (1) vcom (4) vector3 (1) **vector** (51) vectoraligned (1)  
vectorfromthecomtothefacility (1) vectorfromtheearthtothecom (1) vectorpositionsof (1) **vectors** (7) vectorthrough (1)

**vehicle** (4) **velocities** (9) **velocity** (75) velocityattainablefor (1) velocitydeterminesthe (1) verifiable (2)  
verification (1) verified (1) verify (1) **version** (3) vertical (1) **very** (16) **vi** (3) via (2) vibrationalmodesand (1) vibrations (1)  
videos (1) **view** (3) violates (1) **virtual** (7) virtue (1) viscousdamping (1) visited (1) **visualisation** (9) visualise (1)

vj (4) vorbit (3) vpayload1 (2) **vpayload** (10) **vrobot** (5) **VS** (105) **vtether** (8) vulnerable (1) walk (1)  
walks (2) **was** (21) wasassumed (1) waspopularised (1) waspresented (1) watson (1) wave (1) **way** (9) ways (1) we (2)

weak (1) weaknesses (1) weather (1) weathered (1) web-browser (1) **web** (81) webdivisions (1) webpage (1) webs (2)  
website (2) **well** (5) **were** (19) weretobe (1) west (1) western (1) what (2) wheel (1) **when** (58)  
whencalculated (1) whencomparedtogravitygradientstabilisedtethers (1) whennumerically (1) whenrotated (1) whentaking (1)  
whenthetether (1) whenthis (2) **where** (40) **whereas** (4) whereverpractical (1) **whether** (3) whetheronaninclined (1)

**which** (41) whichisanunknownquantityinmmetdynamics (1) whichpoint (1) whichprovide (1) whichprovides (1)  
**while** (32) whilechanging (1) whilekeeping (1) whilerobot1 (1) whole (2) wide (1) wielding (1) wikipedia (2) **will** (71)  
willalmost (1) willbe (2) willbeapproximatelyequal (1) willbederivedfrom (1) willchanceoanificantly (1) **williams** (3) wind (1)

