

-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) 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**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) 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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)
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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)
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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)
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edu (1) eduardovich (1) **effect** (13) effective (1) **effectively** (6) **effects** (7) efficiency (1) **efficient** (4) effort (1)
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endpoint (1) ends (1) energetic (1) **energies** (18) **energy** (54) engine (2) **engineering** (6) english (1)
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ephemeris (2) epsrc (1) **equal** (14) **equally** (4) equate (1) equation4 (2) **equation** (29)
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expressionand (1) **expressions** (4) extant (1) extend (1) extendable (1) extended (1) external (2) extract (1) extrapolate (1)
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find (6) finding (3) findingsof (1) finds (2) **first** (31) firstly (1) firstlybedeployed (1) **firstphase** (3)
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ice (1) icrf (1) **idea** (5) **ideal** (3) idealised (1) idealized (1) **ideaof** (3) ideaofaspaceelevatorwasborn (1) ideas (2) identical5 (1)
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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)

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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)
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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)
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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)
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thetether (14) thetetherarmsareassumed (1) thetetherduetospacedebris (1) thetetherfallsonthegeometric (1)
thetetherpayloadsrotate (1) thetethersand (1) thetethersareassumed (1) thetethersboth (1) thetethershouldthepayloadsrigidlyand (1)
thetetherspreviously (1) thetethersuch (1) thetethersystem (2) thetethertension (1) thetetherto (1) thertextbookbymcinnis (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) they (1) thin (1) things (1) third (1) **this** (198) thisassumptionbuilds (1) thisasymmetry (1)
thiscan (1) thisconcept (1) thiscriteriaforrelease (1) thisdiffersfromtheyzx (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) **tosimplify** (1) **tosolvethesetoflagrange** (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) whichisanunknownquantityinmmtdynamics (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) willchanceoaninclinatv (1) **williams** (3) wind (1)

