**Assignment 3 - REPORT:**

**sxm135730**

**Sushen Kumar Manchukanti**

**Data Structures used :**

I have used ArrayLists to store document info such as headline, max TF and doclen.

I have used a result Hashmap and

a treemap called sorted\_results to store the results of each query in descending order of scores and display them.

ArrayList for posting list.

Hashmap for index.

**Reason for IRRELEVANT documents having high rank :**

Some of these documents have a lot of the words that are present in the query and repeats a lot, although it is not relevant in the sense of the user’s query. Hence these irrelevant documents end up getting a higher score.

**RELEVANT and IRRELEVANT documents :**

Query1: What similarity laws must be obeyed when constructing aeroelastic models of heated high speed aircraft

Relevant Docs : 486,51,12,329,184

Not relevant : 573,14,1263,576,665, 1268

Query2: What are the structural and aeroelastic problems associated with flight of high speed aircraft

Relevant Docs: 12, 746, 172, 792, 1380,

Not Relevant: 14, 1089, 1263, 486, 78, 141, 364, 51

Query3: What problems of heat conduction in composite slabs have been solved so far

Relevant Docs: 485, 144, 5, 91, 399, 181, 485, 584

Not Relevant : 1072, 579, 542, 980

Query4: Can a criterion be developed to show empirically the validity of flow solutions for chemically reacting gas mixtures based on the simplifying assumption of instantaneous local chemical equilibrium

Relevant Docs: 1061, 166, 488, 185, 167

Not relevant: 575, 167, 1315, 24, 1255, 435, 329

Query5: What chemical kinetic system is applicable to hypersonic aerodynamic problems

Relevant Docs : 401, 552, 968

Not Relevant : 103, 625, 163, 1296, 1032, 943, 981, 103, 342, 344, 1032

Query6:What theoretical and experimental guides do we have as to turbulent couette flow behaviour

Relevant Docs: 257, 798, 491, 315, 160, 1374

Non-Relevant Docs: 121, 344, 296, 148, 1075, 287, 767, 610

Query7: Is it possible to relate the available pressure distributions for an ogive forebody at zero angle of attack to the lower surface pressures of an equivalent ogive forebody at angle of attack

Relevant Docs: 492, 122, 124, 56,

Non-Relevant Docs: 57, 373, 434, 973, 1040, 1104, 695, 1231

Query8: What methods -dash exact or approximate -dash are presently available for predicting body pressures at angle of attack

Relevant Docs: 122, 69, 124, 492, 232,

Non-Relevant Docs: 433, 688, 292, 234, 1231, 1104, 248

Query9: Papers on internal /slip flow/ heat transfer studies

Relevant Docs: 550, 21, 22, 571, 270,

Non-Relevant Docs: 45, 306, 102, 1215, 1204, 549, 572, 489, 1268, 89

Query10: Are real-gas transport properties for air available over a wide range of enthalpies and densities

Relevant Docs: 493, 302, 949, 332

Non-Relevant Docs: 1143, 110, 1010, 1264, 1199, 541, 576, 262, 1313

Query11: Is it possible to find an analytical, similar solution of the strong blast wave problem in the newtonian approximation

Relevant Docs: 495, 572, 262

Non Relevant Docs: 25, 556, 110, 1310, 1280, 110, 1186, 28, 305

Query12: How can the aerodynamic performance of channel flow ground effect machines be calculated

Relevant Docs: 624, 966

Non Relevant : 650, 917, 506, 792, 329, 749, 36, 325, 1221

Query13: What is the basic mechanism of the transonic aileron buzz

Relevant Docs: 496, 440

Non Relevant: 903, 520, 313, 38, 880, 415, 797, 927, 199, 520, 643, 38, 880, 313

Query14: Papers on shock-sound wave interaction

Relevant Docs: 64, 798, 170, 132

Non Relevant: 439, 572, 329, 1313, 256, 345, 335, 291, 1364, 291

Query15: Material properties of photoelastic materials

Relevant docs : 462, 463

Not Relevant : 1025,82,1043,1099,1065,542,1065,1340,1027

Query16: Can the transverse potential flow about a body of revolution be calculated efficiently by an electronic computer

Relevant Documents: 498, 1255, 106, 927

Non Relevant Documents: 869, 976, 1328, 231, 231, 704, 1356, 225

Query17: Can the three-dimensional problem of a transverse potential flow about a body of revolution be reduced to a two-dimensional problem

Relevant Documents: 106, 1281

Non Relevant Documents: 916, 373, 801, 336, 1281, 927, 498, 94

Query18: Are experimental pressure distributions on bodies of revolution at angle of attack available

Relevant Documents: 197, 927

Non Relevant Documents: 234, 373, 498, 225, 248, 1352, 56, 1231, 801

Query19: Does there exist a good basic treatment of the dynamics of re-entry combining consideration of realistic effects with relative simplicity of results

Relevant Documents:

Non Relevant Documents: 82, 453, 140, 274, 164, 140, 1346, 1279, 353, 1119, 927, 1296, 1075, 44

Query20: Has anyone formally determined the influence of joule heating, produced by the induced current, in magnetohydrodynamic free convection flows under general conditions

Relevant Documents: 500

Non Relevant Documents: 268, 270, 88, 44, 416, 87, 625, 798, 1371, 375, 1267

**Formula 1 OUTPUT :**

**QUERY :** what similarity laws must be obeyed when constructing aeroelastic models of heated high speed aircraft

Query parsed = [similar, law, must, be, obei, construct, aeroelast, model, heat, high, speed, aircraft]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 51 : 2.167176238509186 : theory of aircraft structural models subjected to aerodynamic RELEVANT

heating and external loads .

2 : 486 : 2.0520983870791754 : similarity laws for aerothermoelastic testing . RELEVANT

3 : 329 : 1.8131156221546842 : various aerodynamic characteristics in hypersonic rarefied gas flow . RELEVANT

4 : 573 : 1.7183549871247896 : viscous hypersonic similitude .

5 : 12 : 1.4001531879153315 : some structural and aerelastic considerations of high

speed flight .RELEVANT

6 : 878 : 1.3911257410154183 : experimental model techniques and equipment for flutter investigations . IRRELEVANT

7 : 172 : 1.380843448654315 : some aerodynamic considerations of nozzle afterbody

combination . IRRELEVANT

8 : 14 : 1.3664812459421596 : piston theory - a new aerodynamic tool for the aeroelastician RELEVANT

.

9 : 13 : 1.3512277785339069 : similarity laws for stressing heated wings . RELEVANT

10 : 576 : 1.3432921428869187 : viscous and inviscid stagnation flow in a dissociated hypervelocity free

stream . IRRELEVANT

**QUERY :** what are the structural and aeroelastic problems associated with flight of high speed aircraft

Query parsed = [ar, structur, and, aeroelast, problem, associ, flight, high, speed, aircraft]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 12 : 2.5079644957829093 : some structural and aerelastic considerations of high

speed flight . RELEVANT

2 : 172 : 1.85357920447996 : some aerodynamic considerations of nozzle afterbody

combination . RELEVANT

3 : 746 : 1.8474462313087574 : aeroelastic problems in connection with high speed

flight . RELEVANT

4 : 14 : 1.772247498264978 : piston theory - a new aerodynamic tool for the aeroelastician IRRELEVANT

.

5 : 792 : 1.7444520062569584 : some low speed problems of high speed aircraft . IRRELEVANT

6 : 1380 : 1.6579355077837745 : the problem of obtaining high lift-drag ratios at supersonic speeds . IRRELEVANT

7 : 51 : 1.64075977351821 : theory of aircraft structural models subjected to aerodynamic heating and external loads . IRRELEVANT

8 : 810 : 1.5738878391448572 : the shock wave noise problem of supersonic aircraft

in steady flight . IRRELEVANT

9 : 1089 : 1.5522773165612251 : aerodynamic characteristics of propeller-driven vtol

aircraft . IRRELEVANT

10 : 100 : 1.486083367150934 : vibration isolation of aircraft power plants . IRRELEVANT

**QUERY :** what problems of heat conduction in composite slabs have been solved so far

Query parsed = [problem, heat, conduct, composit, slab, been, solv, so, far]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 144 : 1.6256218567773342 : heat flow in composite slabs . RELEVANT

2 : 485 : 1.6238349468591755 : linear heat flow in a composite slab . RELEVANT

3 : 1072 : 1.5890640998043346 : ignition and combustion in a laminar mixing zone . RELEVANT

4 : 344 : 1.5447317581183122 : some experimental techniques in mass transfer cooling . IRRELEVANT

5 : 5 : 1.4804628656712222 : one-dimensional transient heat conduction into a double-layer slab subjected to a linear heat input for a small time internal . IRRELEVANT

6 : 181 : 1.4445422664997958 : some problems on heat conduction in stratiform bodies. RELEVANT

7 : 399 : 1.3780926777036 : conduction of heat in composite slabs . RELEVANT

8 : 90 : 1.3586766565709596 : periodic temperature distributions in a two-layer composite slab . RELEVANT

9 : 623 : 1.2624969800164727 : on the coupling between heat and mass transfer . IRRELEVANT

10 : 542 : 1.2404017456651066 : biot's variational principle in heat conduction . IRRELEVANT

QUERY : can a criterion be developed to show empirically the validity of flow solutions for chemically reacting gas mixtures based on the simplifying Assumption of instantaneous local chemical equilibrium

Query parsed = [can, a, criterion, be, develop, to, show, empir, valid, flow, solut, chemic, react, ga, mixtur, base, simplifyingassumpt, instantan, local, chemic, equilibrium]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 166 : 3.1803109989349077 : flow of chemically reacting gas mixtures . RELEVANT

2 : 1061 : 2.822571492308756 : turbulent mixing of a rocket exhaust jet with a supersonic stream including chemical reactions . IRRELEVANT

3 : 167 : 2.694096012312815 : linearized flow of a dissociating gas . IRRELEVANT

4 : 185 : 2.6560557116112338 : some possibilities of using gas mixtures other than in

aerodynamic research . IRRELEVANT

5 : 576 : 2.601409180188375 : viscous and inviscid stagnation flow in a dissociated hypervelocity free stream . IRRELEVANT

6 : 1189 : 2.581785127446702 : nonequilibrium flow past a wedge . IRRELEVANT

7 : 488 : 2.5767251135137785 : a reaction-rate parameter for gasdynamics of a chemically reacting gas mixture . RELEVANT

8 : 24 : 2.5363439500910343 : theory of stagnation point heat transfer in dissociated

air . IRRELEVANT

9 : 575 : 2.522820905860813 : atomic recombination in a hypersonic wind tunnel nozzle . RELEVANT

10 : 1255 : 2.4959275817360362 : the flow about a charged body moving in the lower atmosphere . IRRELEVANT

QUERY : what chemical kinetic system is applicable to hypersonic aerodynamic problems

Query parsed = [chemic, kinet, system, applic, to, hyperson, aerodynam, problem]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 401 : 1.5744438761711772 : inviscid hypersonic airflows with coupled non-equilibrium processes . RELEVANT

2 : 625 : 1.4342884876322484 : viscous and inviscid nonequilibrium gas flows . RELEVANT

3 : 163 : 1.4054016964678997 : an analysis of the corridor and guidance requirements

for supercircular entry planetary atmospheres . RELEVANT

4 : 103 : 1.3665892056909485 : theory of mixing and chemical reaction in the opposed

jet diffusion flame . IRRELEVANT

5 : 552 : 1.334277353275354 : chemical kinetics of high temperature air . RELEVANT

6 : 1296 : 1.3011363805772653 : non-equilibrium expansions of air with coupled chemical reactions . IRRELEVANT

7 : 344 : 1.184468975980789 : some experimental techniques in mass transfer cooling . IRRELAVTN

8 : 1032 : 1.162161091499902 : on the conservativeness of various distributed force systems . IRRELEVANT

9 : 1147 : 1.1400966328387707 : heat transfer to bodies traveling at high speed in the upper atmosphere . RELEVANT

10 : 943 : 1.136944965154683 : compressible free shear layer with finite initial thickness . IRRELEVANT

QUERY : what theoretical and experimental guides do we have as to turbulent couette flow behaviour

Query parsed = [theoret, and, experiment, guid, do, we, as, to, turbul, couett, flow, behaviour]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 798 : 1.980493475448075 : interaction between shock waves and boundary layers, with a note on the effects of the interaction of the performance of supersonic intakes . RELEVANT

2 : 491 : 1.835025478622476 : on the close relationship between turbulent plane-couette and pressure flows . RELEVANT

3 : 315 : 1.741204129718409 : scale effects at high subsonic and transonic speeds

and methods for fixing transition in model experiments . RELEVANT

4 : 257 : 1.6508188130808128 : on turbulen flow between parallel plates . RELEVANT

5 : 767 : 1.573858298353746 : mathematical techniques applying to the thermal fatigue behavior of high temperature alloys . IRRELEVANT

6 : 344 : 1.560394643469891 : some experimental techniques in mass transfer cooling .RELEVANT

7 : 131 : 1.4480662522610859 : two-dimensional jet mixing of a compressible fluid . RELEVANT

8 : 160 : 1.4388629306699396 : approximate analytical solutions for hypersonic flow

past slender power-law bodies . RELEVANT

9 : 121 : 1.427758102011122 : a theory for base pressures in transonic and supersonic

flow . IRRELEVANT

10 : 522 : 1.4154366740092124 : laminar, transitional and turbulent heat transfer to

a cone-cylinder-flare body at mach 8. 0. IRRELEVANT

QUERY : is it possible to relate the available pressure distributions for an ogive forebody at zero angle of attack to the lower surface pressures of an equivalent ogive forebody at angle of attack

Query parsed = [possibl, to, relat, avail, pressur, distribut, an, ogiv, forebodi, at, zero, angl, attack, to, lower, surfac, pressur, an, equival, ogiv, forebodi, at, angl, attack]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 492 : 5.718495415570194 : prediction of ogive-forebody pressures at angles of attack . RELEVANT

2 : 56 : 4.378358357008222 : an analysis of the applicability of the hypersonic

similarity law to the study of the flow about bodies of revolution at zero angle of attack . RELEVANT

3 : 1040 : 4.283717152794964 : on transverse vibrations of thin, shallow elastic shells .IRRELEVANT

4 : 57 : 4.146993063955351 : applicability of the hypersonic similarity rule to

pressure distributions which include the effects of rotation for bodies of revolution at zero angle of attack . RELEVANT

5 : 1231 : 4.102962372993094 : hypersonic flow over an elliptic cone: theory and experiment . RELEVANT

6 : 373 : 4.078644317373036 : the generalized expansion method and its application

to bodies travelling at high supersonic airspeeds . IRRELEVANT

7 : 122 : 3.716977201151297 : a simplified approximate method for the calculation of the pressure around conical bodies of arbitrary shape in supersonic and hypersonic

flow . IRRELEVANT

8 : 232 : 3.6697027649923495 : accuracy of approximate methods for predicting pressure on pointed non-lifting bodies of revolution in supersonic

flow . RELEVANT

9 : 234 : 3.617317431604868 : a second order shock-expansion method applicable to

bodies of revolution near zero lift . IRRELEVANT

10 : 1104 : 3.5685393739463884 : aerodynamic heating of blunt nose shapes at mach numbers up to 14 . IRRELEVANT

QUERY : what methods -dash exact or approximate -dash are presently available for predicting body pressures at angle of attack

Query parsed = [method, -dash, exact, approxim, -dash, ar, present, avail, predict, bodi, pressur, at, angl, attack]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 122 : 2.865360437423474 : a simplified approximate method for the calculation of the pressure around conical bodies of arbitrary shape in supersonic and hypersonic

flow . RELEVANT

2 : 688 : 2.4967019614417865 : tables of aerodynamic coefficients obtained from developed Newtonian expressions for complete and partial conic and spheric bodies at combined angles of attack and sideslip with some comparisons with hypersonic

experimental data . RELEVANT

3 : 492 : 2.479432202195158 : prediction of ogive-forebody pressures at angles of attack . IRRELEVANT

4 : 443 : 2.4683296778015826 : calculated and measured pressure distributions over the midspan section

of the naca 4412 airfoil . IRRELEVANT

5 : 234 : 2.3160839609089106 : a second order shock-expansion method applicable to

bodies of revolution near zero lift . RELEVANT

6 : 1231 : 2.2741582578668353 : hypersonic flow over an elliptic cone: theory and experiment . RELEVANT

7 : 433 : 2.1256320424398774 : application of two dimensional vortex theory to the

prediction of flow fields behind wings of wing-body

combinations at subsonic and supersonic speeds . RELEVANT

8 : 292 : 2.1162164607432263 : rapid laminar boundary layer calculations by piece-wise

application of similar solutions . IRRELEVANT

9 : 232 : 2.074783757446593 : accuracy of approximate methods for predicting pressure

on pointed non-lifting bodies of revolution in supersonic

flow . IRRELEVANT

10 : 1104 : 2.0611489240547143 : aerodynamic heating of blunt nose shapes at mach numbers up to 14 . IRRELAVANT

QUERY : papers on internal /slip flow/ heat transfer studies

Query parsed = [paper, intern, slip, flow, heat, transfer, studi]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 45 : 1.7681799200456891 : an investigation of separated flows, part ii: flow

in the cavity and heat transfer .

2 : 306 : 1.3362467565413119 : second approximation to laminar compressible boundary

layer on flat plate in slip flow .

3 : 270 : 1.3346816990137533 : on combined free and forced convection laminar magnetohydrodynamic

flow and heat transfer in channels with transverse

magnetic field .

4 : 571 : 1.2652133604035947 : heat transfer to flat plate in high temperature rarefied

ultra-high mach number flow .

5 : 21 : 1.2418923261594235 : on heat transfer in slip flow .

6 : 102 : 1.1987993114900792 : advantages and limitations of models .

7 : 398 : 1.1780981798351475 : heat transfer in turbulent shear flow .

8 : 549 : 1.1339736148086852 : experimental study of the velocity and temperature

distribution in a high-velocity vortex-type flow .

9 : 22 : 1.1304307654773988 : on slip-flow heat transfer to a flat plate .

10 : 983 : 1.1228717469371698 : addendum to 'heat transfer to satellite vehicles re-entering the atmosphere

.

QUERY : are real-gas transport properties for air available over a wide range of enthalpies and densities

Query parsed = [ar, real-ga, transport, properti, air, avail, over, a, wide, rang, enthalpi, and, densiti]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 493 : 2.4640312524494465 : real-gas laminar boundary layer skin friction and heat

transfer .

2 : 302 : 2.3625361066233075 : approximations for the thermodynamic and transport properties of high

temperature air .

3 : 949 : 1.9703805477493535 : charts for equilibrium flow properties of air in hypervelocity

nozzles .

4 : 1264 : 1.831800010830597 : boundary layer transition and heat transfer in shock

tubes .

5 : 1214 : 1.803040508968984 : the drag of elongated bodies over a wide reynolds number

range .

6 : 616 : 1.7423554933773582 : determination of upper-atmosphere air density and scale height from

satellite observations .

7 : 110 : 1.689360352853515 : dynamics of a dissociating gas .

8 : 1199 : 1.661463767406594 : theoretical investigations of a supersonic laminar

boundary layer with foreign-gas injection .

9 : 1010 : 1.6145276675913047 : free-flight measurements of the static and dynamic

10 : 1150 : 1.5940439525373733 : preliminary results of density measurements from an air force satellite.

QUERY : is it possible to find an analytical, similar solution of the strong blast wave problem in the newtonian approximation

Query parsed = [possibl, to, find, an, analyt, similar, solut, strong, blast, wave, problem, newtonian, approxim]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 495 : 2.785436049163406 : on similar solutions for strong blast waves and their

application to steady hypersonic flow .

2 : 1375 : 1.8926752266898026 : an approximate solution for the axisymmetric jet of a laminar

compressible fluid .

3 : 72 : 1.8708732199863911 : boundary layer behind shock or thin expansion wave

moving into stationary fluid .

4 : 1280 : 1.8294796991961921 : wings with minimum drag due to lift in supersonic flow .

5 : 304 : 1.817910629072561 : first-order approach to a strong interaction problem

in hypersonic flow over an insulated flat plate .

6 : 25 : 1.7454572382533207 : inviscid hypersonic flow over blunt-nosed slender bodies .

7 : 1186 : 1.6711087537564162 : lift of slender delta wings according to newtonian

theory .

8 : 1248 : 1.6675819105274412 : an analytic extension of the shock-expansion method .

9 : 556 : 1.6675143584063177 : numerical comparison between exact and approximate

theories of hypersonic inviscid flow past slender blunt

nosed bodies .

10 : 472 : 1.6556603110736154 : waves in supersonic flow .

QUERY : how can the aerodynamic performance of channel flow ground effect machines be calculated

Query parsed = [can, aerodynam, perform, channel, flow, ground, effect, machin, be, calcul]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 624 : 1.9058643263823838 : cruise performance of channel-flow ground effect machines .

2 : 966 : 1.8655616690156456 : on fully developed channel flows,. some solutions and limitations, and

effects of compressibility, variable properties, and body forces .

3 : 917 : 1.5709351410865968 : a method of calculating the short period longitudinal

stability derivatives of a wing in linearised unsteady

compressible flow .

4 : 792 : 1.5202722604473042 : some low speed problems of high speed aircraft .

5 : 325 : 1.5188049239958317 : heat transfer to constant property laminar boundary

layer flows with power function free stream velocity

and wall temperature variation .

6 : 704 : 1.506776915382256 : a systematic kernel function procedure for determining aerodynamic

forces on oscillating or steady finite wings at subsonic speeds .

7 : 329 : 1.5007503459255054 : various aerodynamic characteristics in hypersonic rarefied

gas flow .

8 : 206 : 1.3475615760109065 : the applications of the polygon method to the calculation

of the compressible subsonic flow round two-dimensional

profiles .

9 : 1289 : 1.3304722848510646 : numerical technique to lifting surface theory for calculation

of unsteady aerodynamic forces due to continuous sinusoidal

gusts on several wing planforms at sobsonic speeds .

10 : 749 : 1.2737088331075737 : the aerodynamic effects of aspect ratio and sweepback

on wing flutter .

QUERY : what is the basic mechanism of the transonic aileron buzz

Query parsed = [basic, mechan, transon, aileron, buzz]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 496 : 1.7658898510326522 : a theory of transonic aileron buzz, neglecting viscous

effects .

2 : 903 : 1.2236628399482936 : two dimensional transonic unsteady flow with shock

waves .

3 : 520 : 1.0408644213849492 : wing-tail interference as a cause of 'magnus' effects

on a finned missile .

4 : 38 : 0.7533455771481636 : on the prediction of mixed subsonic/supersonic pressure

distributions .

5 : 797 : 0.7299678681857702 : a study of the effect of leading-edge modifications on the flow over

a 50degree sweptback wing at transonic speeds .

6 : 440 : 0.7212010987526642 : compilation of information on the transonic attachment

of flows at the leading edge of airfoils .

7 : 313 : 0.6935096001294137 : on alternative forms for the basic equations of transonic

flow theory .

8 : 643 : 0.6817156562713534 : an investigation of wing-aileron flutter using ground

launched rocket models .

9 : 199 : 0.6236566591450257 : measurement of two dimensional derivatives on a wing-aileron-tab

system .

10 : 880 : 0.6014946596061137 : the design and testing of supersonic flutter models .

QUERY : papers on shock-sound wave interaction

Query parsed = [paper, shock-sound, wave, interact]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 798 : 0.9591316795674247 : interaction between shock waves and boundary layers, with a note on the

effects of the interaction of the performance of supersonic intakes .

2 : 170 : 0.954765452623803 : the interaction of a reflected shock wave with the

boundary layer in a shock tube .

3 : 439 : 0.8530298575293634 : a factor affecting transonic leading edge flow separation .

4 : 256 : 0.7472492667421112 : an experimental study of the glancing interaction between

a shock wave and a turbulent boundary layer .

5 : 1313 : 0.7422895212090428 : on the flow in a reflected shock tunnel .

6 : 1364 : 0.737082240911499 : an experimental investigation of the interaction between shock waves and

boundary layers .

7 : 329 : 0.7109550076226087 : various aerodynamic characteristics in hypersonic rarefied

gas flow .

8 : 291 : 0.7051435788467845 : sweepback effects in the turbulent boundary-layer shock-wave

interaction .

9 : 569 : 0.6929430991934108 : an experimental investigation of leading edge shock wave boundary layer

interaction at mach 5.8 .

10 : 345 : 0.6894769016325283 : the interaction of shock waves with boundary layer

on a flat surface .

QUERY : material properties of photoelastic materials

Query parsed = [materi, properti, photoelast, materi]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 462 : 1.735944414798095 : photo-thermoelasticity .

2 : 1025 : 1.195279754243228 : note on creep buckling of columns .

3 : 463 : 1.1940552833616627 : physical properties of plastics for photo-thermoelastic

investigation .

4 : 1099 : 1.0440453059458805 : a theoretical study of stagnation point ablation .

5 : 1097 : 1.0352425139092332 : experimental ablation cooling .

6 : 542 : 1.0188141118358747 : biot's variational principle in heat conduction .

7 : 1043 : 1.016371659142255 : on transverse vibrations of thin, shallow elastic shells .

8 : 82 : 1.0131258517356838 : theoretical investigation of the ablation of a glass-type

heat protection shield of varied material properties

at the stagnation point of a re-entering irbm .

9 : 1340 : 0.9693248598419126 : method of controlling stiffness properties of a solid-construction

model wing .

10 : 1127 : 0.9693248598419126 : the buckling of sandwich type panels .

QUERY : can the transverse potential flow about a body of revolution be calculated efficiently by an electronic computer

Query parsed = [can, transvers, potenti, flow, about, a, bodi, revolut, be, calcul, effici, by, an, electron, comput]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 498 : 3.001065882286783 : calculation of potential flow about bodies of revolution

having axes perpendicular to the free-stream direction .

2 : 1255 : 2.477216458999013 : the flow about a charged body moving in the lower atmosphere .

3 : 266 : 2.424559867199339 : exact solution of the neumann problem . calculation

for non- circulatory plane and axially symmetric flows

about or within arbitrary boundaries .

4 : 1328 : 2.2739219128011934 : the production of aerodynamic forces by heat addition

on external surfaces of aircraft .

5 : 927 : 2.21752341024933 : investigation of normal force distributions and wake

vortex characteristics of bodies of revolution at supersonic

speeds .

6 : 1108 : 2.164322031786857 : a study of second-order supersonic flow theory .

7 : 106 : 2.155653692927757 : the transverse potential flow past a body of revolution .

8 : 231 : 2.132099047629888 : practical calculation of second-order supersonic flow

past non-lifting bodies of revolution .

9 : 869 : 2.0975254798090015 : the calculation of transient temperature in turbine

blades and tapered discs using biot's variational method .

10 : 801 : 2.046410707099953 : experimental study of the equivalence of transonic

flow about slender cone-cylinders of circular and elliptic

cross section .

QUERY : can the three-dimensional problem of a transverse potential flow about a body of revolution be reduced to a two-dimensional problem

Query parsed = [can, three-dimension, problem, a, transvers, potenti, flow, about, a, bodi, revolut, be, reduc, to, a, two-dimension, problem]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 1108 : 3.3613540314384736 : a study of second-order supersonic flow theory .

2 : 1281 : 2.797999292996583 : turbulent heat transfer on blunt-nosed bodies in two-dimensional

and general three-dimensional hypersonic flow .

3 : 1301 : 2.784649598226155 : compressible boundary layers on bodies of revolution .

4 : 410 : 2.6822783056589623 : the supersonic flow about a blunt body of revolution

for gases at chemical equilibrium .

5 : 266 : 2.667726966240977 : exact solution of the neumann problem . calculation

for non- circulatory plane and axially symmetric flows

about or within arbitrary boundaries .

6 : 373 : 2.558856661032118 : the generalized expansion method and its application

to bodies travelling at high supersonic airspeeds .

7 : 1224 : 2.518812525520298 : on the plk method and the supersonic blunt-body problem .

8 : 933 : 2.4942509542278306 : the characteristics of roughness from insects as observed

for two-dimensional, incompressible flow past airfoils .

9 : 1248 : 2.48127925869439 : an analytic extension of the shock-expansion method .

10 : 94 : 2.4185001283585303 : the transverse curvature effect in compressible axially

symmetric laminar boundary layer flow .

QUERY : are experimental pressure distributions on bodies of revolution at angle of attack available

Query parsed = [ar, experiment, pressur, distribut, bodi, revolut, at, angl, attack, avail]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 234 : 2.31187865292962 : a second order shock-expansion method applicable to

bodies of revolution near zero lift .

2 : 197 : 2.220968185131448 : pressure distributions on three bodies of revolution

to determine the effect of reynolds number up to and

including the transonic speed range .

3 : 927 : 2.19920681282775 : investigation of normal force distributions and wake

vortex characteristics of bodies of revolution at supersonic

speeds .

4 : 498 : 2.1760372238450945 : calculation of potential flow about bodies of revolution

having axes perpendicular to the free-stream direction .

5 : 56 : 2.1281154160296696 : an analysis of the applicability of the hypersonic

similarity law to the study of the flow about bodies

of revolution at zero angle of attack .

6 : 248 : 2.086286854533874 : the application of lighthill formula for numerical

calculation of pressure distributions on bodies of

revolution at supersonic speed and zero angle of attack .

7 : 1231 : 2.0246354378162255 : hypersonic flow over an elliptic cone: theory and experiment .

8 : 1352 : 1.9582031308733032 : aerodynamic investigation of a parabolic body of revolution

at mach number of 1. 92 and some effects of an annular

supersonic jet exhausting from the base .

9 : 1104 : 1.9183916302503383 : aerodynamic heating of blunt nose shapes at mach numbers up to 14 .

10 : 122 : 1.9130146215019197 : a simplified approximate method for the calculation of the pressure

around conical bodies of arbitrary shape in supersonic and hypersonic

flow .

QUERY : does there exist a good basic treatment of the dynamics of re-entry combining consideration of realistic effects with relative simplicity of results

Query parsed = [doe, exist, a, good, basic, treatment, dynam, re-entri, combin, consider, realist, effect, rel, simplic, result]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 140 : 1.6516858787096391 : the determination of turbulent skin friction by means

of pitot tubes .

2 : 82 : 1.59154478297017 : theoretical investigation of the ablation of a glass-type

heat protection shield of varied material properties

at the stagnation point of a re-entering irbm .

3 : 44 : 1.4178786948323014 : tip-bluntness effects on cone pressures at m=6.85.

4 : 453 : 1.4006017081824287 : the influence of two-dimensional stream shear on airfoil maximum lift .

5 : 274 : 1.3906396099616227 : analysis of quartz and teflon shields for a particular

re-entry mission .

6 : 927 : 1.3859087484401322 : investigation of normal force distributions and wake

vortex characteristics of bodies of revolution at supersonic

speeds .

7 : 1119 : 1.3738915441853419 : plastic stability theory of thin shells .

8 : 344 : 1.3620903089723886 : some experimental techniques in mass transfer cooling .

9 : 122 : 1.3094943194405744 : a simplified approximate method for the calculation of the pressure

around conical bodies of arbitrary shape in supersonic and hypersonic

flow .

10 : 416 : 1.3008215312078146 : methods of boundary-layer control for postponing and alleviating

buffeting and other effects of shock-induced separation .

QUERY : has anyone formally determined the influence of joule heating, produced by the induced current, in magnetohydrodynamic free convection flows under general conditions

Query parsed = [ha, anyon, formal, determin, influenc, joul, heat, produc, by, induc, current, magnetohydrodynam, free, convect, flow, under, gener, condit]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 500 : 2.440099205803696 : joule heating in magnetohydrodynamic free-convection

flows .

2 : 270 : 2.384729714672998 : on combined free and forced convection laminar magnetohydrodynamic

flow and heat transfer in channels with transverse

magnetic field .

3 : 625 : 1.879258547685508 : viscous and inviscid nonequilibrium gas flows .

4 : 44 : 1.8747980341503314 : tip-bluntness effects on cone pressures at m=6.85.

5 : 87 : 1.766857410434673 : free-convection magnetohydrodynamic flow past a porous flat plate .

6 : 268 : 1.7568869014635364 : several magnetohydrodynamic free-convection solutions .

7 : 88 : 1.7190186998650134 : magnetohydrodynamic free-convection pipe flow .

8 : 131 : 1.7000655788726695 : two-dimensional jet mixing of a compressible fluid .

9 : 123 : 1.6673685569934744 : the downstream influence of mass transfer at the nose

of a slender cone .

10 : 456 : 1.6523452167703385 : a study of flow fields about some typical blunt-nosed

slender bodies .

**Formula 2 OUTPUT :**

QUERY : what similarity laws must be obeyed when constructing aeroelastic models of heated high speed aircraft

Query parsed = [similar, law, must, be, obei, construct, aeroelast, model, heat, high, speed, aircraft]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 51 : 3.909084852362758 : theory of aircraft structural models subjected to aerodynamic

heating and external loads .

2 : 486 : 3.7575802546028942 : similarity laws for aerothermoelastic testing .

3 : 573 : 3.6812079214668403 : viscous hypersonic similitude .

4 : 329 : 3.3348848229221537 : various aerodynamic characteristics in hypersonic rarefied

gas flow .

5 : 12 : 3.042492418474085 : some structural and aerelastic considerations of high

speed flight .

6 : 878 : 3.0088737155575833 : experimental model techniques and equipment for flutter

investigations .

7 : 1003 : 2.8885427374568637 : free-flight measurements of the static and dynamic

8 : 663 : 2.8788066353664474 : viscous flow along a flat plate moving at high speeds .

9 : 747 : 2.878329661239857 : bodt freedom flutter of ground launched rocket models

at supersonic and high subsonic speeds .

10 : 576 : 2.8167849663682873 : viscous and inviscid stagnation flow in a dissociated hypervelocity free

stream .

QUERY : what are the structural and aeroelastic problems associated with flight of high speed aircraft

Query parsed = [ar, structur, and, aeroelast, problem, associ, flight, high, speed, aircraft]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 12 : 5.344166341724108 : some structural and aerelastic considerations of high

speed flight .

2 : 746 : 4.053166986904099 : aeroelastic problems in connection with high speed

flight .

3 : 172 : 3.9863765680051984 : some aerodynamic considerations of nozzle afterbody

combination .

4 : 1380 : 3.9697571040904727 : the problem of obtaining high lift-drag ratios at supersonic speeds .

5 : 1089 : 3.9167521762206428 : aerodynamic characteristics of propeller-driven vtol

aircraft .

6 : 792 : 3.500763314584295 : some low speed problems of high speed aircraft .

7 : 14 : 3.4422188720963924 : piston theory - a new aerodynamic tool for the aeroelastician

.

8 : 747 : 3.3612541560517397 : bodt freedom flutter of ground launched rocket models

at supersonic and high subsonic speeds .

9 : 700 : 3.3361676566282448 : two and three-dimensional unsteady lift problems in high speed flight .

10 : 51 : 3.198346745277941 : theory of aircraft structural models subjected to aerodynamic

heating and external loads .

QUERY : what problems of heat conduction in composite slabs have been solved so far

Query parsed = [problem, heat, conduct, composit, slab, been, solv, so, far]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 1072 : 2.890303234559085 : ignition and combustion in a laminar mixing zone .

2 : 344 : 2.8812316692959707 : some experimental techniques in mass transfer cooling .

3 : 144 : 2.6578189907564096 : heat flow in composite slabs .

4 : 5 : 2.6120101513647347 : one-dimensional transient heat conduction into a double-layer

slab subjected to a linear heat input for a small time

internal .

5 : 485 : 2.6017602653583296 : linear heat flow in a composite slab .

6 : 623 : 2.5426033575490785 : on the coupling between heat and mass transfer .

7 : 980 : 2.5310965374930388 : a method of computing the transient temperature of thick walls from

arbitrary variation of adiabatic-wall temperature and heat-transfer coefficient

.

8 : 399 : 2.5060577368172785 : conduction of heat in composite slabs .

9 : 181 : 2.4146747027751925 : some problems on heat conduction in stratiform bodies .

10 : 329 : 2.4082884935785938 : various aerodynamic characteristics in hypersonic rarefied

gas flow .

QUERY : can a criterion be developed to show empirically the validity of flow solutions for chemically reacting gas mixtures based on the simplifyingassumption of instantaneous local chemical equilibrium

Query parsed = [can, a, criterion, be, develop, to, show, empir, valid, flow, solut, chemic, react, ga, mixtur, base, simplifyingassumpt, instantan, local, chemic, equilibrium]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 167 : 6.355376178477838 : linearized flow of a dissociating gas .

2 : 1255 : 5.82048740078629 : the flow about a charged body moving in the lower atmosphere .

3 : 166 : 5.808622490125105 : flow of chemically reacting gas mixtures .

4 : 1189 : 5.773217044328855 : nonequilibrium flow past a wedge .

5 : 1061 : 5.7650908527187426 : turbulent mixing of a rocket exhaust jet with a supersonic stream including

chemical reactions .

6 : 1315 : 5.739847807564228 : performance estimates for the rae 6in . high-pressure

shock tube .

7 : 24 : 5.516894232513956 : theory of stagnation point heat transfer in dissociated

air .

8 : 576 : 5.351976182108578 : viscous and inviscid stagnation flow in a dissociated hypervelocity free

stream .

9 : 575 : 5.218108932811278 : atomic recombination in a hypersonic wind tunnel nozzle .

10 : 401 : 5.156156704235928 : inviscid hypersonic airflows with coupled non-equilibrium

processes .

QUERY : what chemical kinetic system is applicable to hypersonic aerodynamic problems

Query parsed = [chemic, kinet, system, applic, to, hyperson, aerodynam, problem]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 401 : 3.1430525943998537 : inviscid hypersonic airflows with coupled non-equilibrium

processes .

2 : 625 : 3.0329393509368403 : viscous and inviscid nonequilibrium gas flows .

3 : 163 : 2.863040072266312 : an analysis of the corridor and guidance requirements

for supercircular entry planetary atmospheres .

4 : 981 : 2.746793779955782 : solutions to the heat-conduction equation with time dependent boundary

conditions .

5 : 552 : 2.6170816201217764 : chemical kinetics of high temperature air .

6 : 103 : 2.5129221383364357 : theory of mixing and chemical reaction in the opposed

jet diffusion flame .

7 : 342 : 2.4467905836818087 : effect of diffusion fields on the laminar boundary

layer .

8 : 943 : 2.4347130213315955 : compressible free shear layer with finite initial thickness .

9 : 1032 : 2.422829026352021 : on the conservativeness of various distributed force systems .

10 : 344 : 2.386395115562208 : some experimental techniques in mass transfer cooling .

QUERY : what theoretical and experimental guides do we have as to turbulent couette flow behaviour

Query parsed = [theoret, and, experiment, guid, do, we, as, to, turbul, couett, flow, behaviour]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 491 : 3.99828597342884 : on the close relationship between turbulent plane-couette

and pressure flows .

2 : 798 : 3.894685881913526 : interaction between shock waves and boundary layers, with a note on the

effects of the interaction of the performance of supersonic intakes .

3 : 121 : 3.8470343486547334 : a theory for base pressures in transonic and supersonic

flow .

4 : 287 : 3.7934529034670543 : some theoretical low-speed loading characteristics

of swept wings in roll and sideslip .

5 : 257 : 3.541298956873752 : on turbulen flow between parallel plates .

6 : 767 : 3.504520400555863 : mathematical techniques applying to the thermal fatigue behaviour

of high temperature alloys .

7 : 131 : 3.4764643026955846 : two-dimensional jet mixing of a compressible fluid .

8 : 187 : 3.432636050885738 : investigation of separated flows in supersonic and subsonic

streams with emphasis on the effect of transition .

9 : 315 : 3.4282838434092024 : scale effects at high subsonic and transonic speeds

and methods for fixing transition in model experiments .

10 : 522 : 3.3865081747163086 : laminar, transitional and turbulent heat transfer to

a cone-cylinder-flare body at mach 8. 0.

QUERY : is it possible to relate the available pressure distributions for an ogive forebody at zero angle of attack to the lower surface pressures of an equivalent ogive forebody at angle of attack

Query parsed = [possibl, to, relat, avail, pressur, distribut, an, ogiv, forebodi, at, zero, angl, attack, to, lower, surfac, pressur, an, equival, ogiv, forebodi, at, angl, attack]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 492 : 10.85850896259961 : prediction of ogive-forebody pressures at angles of attack .

2 : 373 : 8.70357347996142 : the generalized expansion method and its application

to bodies travelling at high supersonic airspeeds .

3 : 56 : 8.336991789528902 : an analysis of the applicability of the hypersonic

similarity law to the study of the flow about bodies

of revolution at zero angle of attack .

4 : 248 : 8.246720632309865 : the application of lighthill formula for numerical

calculation of pressure distributions on bodies of

revolution at supersonic speed and zero angle of attack .

5 : 498 : 8.118019228180508 : calculation of potential flow about bodies of revolution

having axes perpendicular to the free-stream direction .

6 : 1104 : 8.025246966284874 : aerodynamic heating of blunt nose shapes at mach numbers up to 14 .

7 : 1231 : 7.957887403246282 : hypersonic flow over an elliptic cone: theory and experiment .

8 : 57 : 7.795594546938546 : applicability of the hypersonic similarity rule to

pressure distributions which include the effects of

rotation for bodies of revolution at zero angle of

attack .

9 : 232 : 7.749591827992658 : accuracy of approximate methods for predicting pressure

on pointed non-lifting bodies of revolution in supersonic

flow .

10 : 27 : 7.573337062595668 : newtonian flow theory for slender bodies .

QUERY : what methods -dash exact or approximate -dash are presently available for predicting body pressures at angle of attack

Query parsed = [method, -dash, exact, approxim, -dash, ar, present, avail, predict, bodi, pressur, at, angl, attack]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 122 : 5.728772151937234 : a simplified approximate method for the calculation of the pressure

around conical bodies of arbitrary shape in supersonic and hypersonic

flow .

2 : 492 : 5.558610433892209 : prediction of ogive-forebody pressures at angles of attack .

3 : 688 : 5.201239179047383 : tables of aerodynamic coefficients obtained from developed newtonian

expressions for complete and partial conic and spheric bodies at combined

angles of attack and sideslip with some comparisons with hypersonic

experimental data .

4 : 248 : 5.009001352947961 : the application of lighthill formula for numerical

calculation of pressure distributions on bodies of

revolution at supersonic speed and zero angle of attack .

5 : 292 : 4.952985795672977 : rapid laminar boundary layer calculations by piece-wise

application of similar solutions .

6 : 124 : 4.917765875840093 : a summary of the supersonic pressure drag of bodies

of revolution .

7 : 234 : 4.762834120460013 : a second order shock-expansion method applicable to

bodies of revolution near zero lift .

8 : 1231 : 4.64626937716345 : hypersonic flow over an elliptic cone: theory and experiment .

9 : 443 : 4.634890996971428 : calculated and measured pressure distributions over the midspan section

of the naca 4412 airfoil .

10 : 232 : 4.629426795196054 : accuracy of approximate methods for predicting pressure

on pointed non-lifting bodies of revolution in supersonic

flow .

QUERY : papers on internal /slip flow/ heat transfer studies

Query parsed = [paper, intern, slip, flow, heat, transfer, studi]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 45 : 3.578132494300327 : an investigation of separated flows, part ii: flow

in the cavity and heat transfer .

2 : 549 : 2.785443360809558 : experimental study of the velocity and temperature

distribution in a high-velocity vortex-type flow .

3 : 550 : 2.783924028475186 : laminar heat transfer in tubes under slip-flow conditions .

4 : 489 : 2.7338598040734365 : on calculation of the laminar separation point and

results of certain flows .

5 : 270 : 2.682638469807407 : on combined free and forced convection laminar magnetohydrodynamic

flow and heat transfer in channels with transverse

magnetic field .

6 : 306 : 2.4784541409540157 : second approximation to laminar compressible boundary

layer on flat plate in slip flow .

7 : 21 : 2.4149550067632997 : on heat transfer in slip flow .

8 : 1268 : 2.376492230747179 : stable combustion of a high-velocity gas in a heated

boundary layer .

9 : 22 : 2.3759584997356407 : on slip-flow heat transfer to a flat plate .

10 : 102 : 2.36978270007061 : advantages and limitations of models .

QUERY : are real-gas transport properties for air available over a wide range of enthalpies and densities

Query parsed = [ar, real-ga, transport, properti, air, avail, over, a, wide, rang, enthalpi, and, densiti]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 302 : 5.242278617186736 : approximations for the thermodynamic and transport properties of high

temperature air .

2 : 493 : 4.41278818994823 : real-gas laminar boundary layer skin friction and heat

transfer .

3 : 949 : 4.102835095106805 : charts for equilibrium flow properties of air in hypervelocity

nozzles .

4 : 1264 : 3.9868935206154896 : boundary layer transition and heat transfer in shock

tubes .

5 : 1010 : 3.977758696563615 : free-flight measurements of the static and dynamic

6 : 616 : 3.9201697819078167 : determination of upper-atmosphere air density and scale height from

satellite observations .

7 : 1214 : 3.6288389805721004 : the drag of elongated bodies over a wide reynolds number

range .

8 : 781 : 3.5746721322592614 : use of subsonic kernel function in an influence-coefficient method of

aeroelastic analysis and some comparisons with experiment .

9 : 541 : 3.5039266493784944 : similitude of hypersonic flows over slender bodies

in non-equilibrium dissociated gases .

10 : 691 : 3.468087754040417 : calculation procedure for thermodynamic transport, and flow properties

of the combustion products of a hydrocarbon fuel mixture burned in air

with results for ethylene-air and methane-air mixtures .

QUERY : is it possible to find an analytical, similar solution of the strong blast wave problem in the newtonian approximation

Query parsed = [possibl, to, find, an, analyt, similar, solut, strong, blast, wave, problem, newtonian, approxim]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 495 : 5.390403984604547 : on similar solutions for strong blast waves and their

application to steady hypersonic flow .

2 : 1375 : 4.080132147515007 : an approximate solution for the axisymmetric jet of a laminar

compressible fluid .

3 : 1280 : 4.016609380058032 : wings with minimum drag due to lift in supersonic flow .

4 : 28 : 3.9748276656448827 : a note on the explosion solution of sedov with application

to the newtonian theory of unsteady hypersonic flow .

5 : 305 : 3.9641795502803996 : hypersonic strong viscous interaction on a flat plate

with surface mass transfer .

6 : 472 : 3.9475531200739598 : waves in supersonic flow .

7 : 1186 : 3.9408550154272564 : lift of slender delta wings according to newtonian

theory .

8 : 72 : 3.6425373681634228 : boundary layer behind shock or thin expansion wave

moving into stationary fluid .

9 : 304 : 3.601426756085456 : first-order approach to a strong interaction problem

in hypersonic flow over an insulated flat plate .

10 : 667 : 3.540855089834207 : hypersonic shock layer theory of the stagnation region at low reynolds

number .

QUERY : how can the aerodynamic performance of channel flow ground effect machines be calculated

Query parsed = [can, aerodynam, perform, channel, flow, ground, effect, machin, be, calcul]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 966 : 3.6674108437295905 : on fully developed channel flows,. some solutions and limitations, and

effects of compressibility, variable properties, and body forces .

2 : 624 : 3.60988625251224 : cruise performance of channel-flow ground effect machines .

3 : 917 : 3.5003335202146593 : a method of calculating the short period longitudinal

stability derivatives of a wing in linearised unsteady

compressible flow .

4 : 329 : 3.3052892635710833 : various aerodynamic characteristics in hypersonic rarefied

gas flow .

5 : 792 : 3.295609614340277 : some low speed problems of high speed aircraft .

6 : 749 : 3.282021897367304 : the aerodynamic effects of aspect ratio and sweepback

on wing flutter .

7 : 36 : 3.226589181875519 : supersonic flow around blunt bodies .

8 : 325 : 3.0587029933848084 : heat transfer to constant property laminar boundary

layer flows with power function free stream velocity

and wall temperature variation .

9 : 1289 : 3.0247520462283113 : numerical technique to lifting surface theory for calculation

of unsteady aerodynamic forces due to continuous sinusoidal

gusts on several wing planforms at sobsonic speeds .

10 : 704 : 2.954355480296509 : a systematic kernel function procedure for determining aerodynamic

forces on oscillating or steady finite wings at subsonic speeds .

QUERY : what is the basic mechanism of the transonic aileron buzz

Query parsed = [basic, mechan, transon, aileron, buzz]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 496 : 2.3446142235375267 : a theory of transonic aileron buzz, neglecting viscous

effects .

2 : 903 : 1.7458516220262774 : two dimensional transonic unsteady flow with shock

waves .

3 : 520 : 1.6561623106107217 : wing-tail interference as a cause of 'magnus' effects

on a finned missile .

4 : 440 : 1.2920969985965949 : compilation of information on the transonic attachment

of flows at the leading edge of airfoils .

5 : 313 : 1.2920969985965949 : on alternative forms for the basic equations of transonic

flow theory .

6 : 38 : 1.2839926868931115 : on the prediction of mixed subsonic/supersonic pressure

distributions .

7 : 880 : 1.2490637511575158 : the design and testing of supersonic flutter models .

8 : 415 : 1.2490637511575158 : the aerodynamic design of section shapes for swept wings .

9 : 797 : 1.136797813368137 : a study of the effect of leading-edge modifications on the flow over

a 50degree sweptback wing at transonic speeds .

10 : 927 : 0.9496879170525052 : investigation of normal force distributions and wake

vortex characteristics of bodies of revolution at supersonic

speeds .

QUERY : papers on shock-sound wave interaction

Query parsed = [paper, shock-sound, wave, interact]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 170 : 1.6538260326596486 : the interaction of a reflected shock wave with the

boundary layer in a shock tube .

2 : 798 : 1.6306865079615926 : interaction between shock waves and boundary layers, with a note on the

effects of the interaction of the performance of supersonic intakes .

3 : 439 : 1.5783001145828757 : a factor affecting transonic leading edge flow separation .

4 : 1313 : 1.4244369379776292 : on the flow in a reflected shock tunnel .

5 : 329 : 1.3996175289488162 : various aerodynamic characteristics in hypersonic rarefied

gas flow .

6 : 256 : 1.2758034272071788 : an experimental study of the glancing interaction between

a shock wave and a turbulent boundary layer .

7 : 345 : 1.2634954075489944 : the interaction of shock waves with boundary layer

on a flat surface .

8 : 335 : 1.2508435329955008 : the interaction between boundary layer and shock waves in transonic

flow .

9 : 64 : 1.2368059654386143 : unsteady oblique interaction of a shock wave with plane

disturbances .

10 : 308 : 1.2108046797893817 : on the hypersonic viscous flow past a flat plate with

suction or injection .

QUERY : material properties of photoelastic materials

Query parsed = [materi, properti, photoelast, materi]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 462 : 2.7704675913536745 : photo-thermoelasticity .

2 : 463 : 1.9505825220508404 : physical properties of plastics for photo-thermoelastic

investigation .

3 : 1065 : 1.896307631038063 : a free-flight investigation of ablation of a blunt

body to a mach number of 13 .1.

4 : 1099 : 1.896307631038063 : a theoretical study of stagnation point ablation .

5 : 1340 : 1.896307631038063 : method of controlling stiffness properties of a solid-construction

model wing .

6 : 1027 : 1.8119167122891726 : note on creep buckling of columns .

7 : 890 : 1.8119167122891726 : comments on 'thermal buckling of clamped cylindrical shells' .

8 : 817 : 1.8119167122891726 : loading paths and the incremental stress law .

9 : 981 : 1.8119167122891726 : solutions to the heat-conduction equation with time dependent boundary

conditions .

10 : 82 : 1.7697212529147275 : theoretical investigation of the ablation of a glass-type

heat protection shield of varied material properties

at the stagnation point of a re-entering irbm .

QUERY : can the transverse potential flow about a body of revolution be calculated efficiently by an electronic computer

Query parsed = [can, transvers, potenti, flow, about, a, bodi, revolut, be, calcul, effici, by, an, electron, comput]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 498 : 6.429234855570226 : calculation of potential flow about bodies of revolution

having axes perpendicular to the free-stream direction .

2 : 1255 : 5.511833603050288 : the flow about a charged body moving in the lower atmosphere .

3 : 266 : 5.165118115055876 : exact solution of the neumann problem . calculation

for non- circulatory plane and axially symmetric flows

about or within arbitrary boundaries .

4 : 231 : 4.975931734526915 : practical calculation of second-order supersonic flow

past non-lifting bodies of revolution .

5 : 1259 : 4.959033564865972 : second-order theory for unsteady supersonic flow past

slender pointed bodies of revolution .

6 : 248 : 4.924647522599515 : the application of lighthill formula for numerical

calculation of pressure distributions on bodies of

revolution at supersonic speed and zero angle of attack .

7 : 1356 : 4.905585923205685 : secondary flow fields embedded in hypersonic shock

layers .

8 : 801 : 4.9004500665618504 : experimental study of the equivalence of transonic

flow about slender cone-cylinders of circular and elliptic

cross section .

9 : 927 : 4.838294256700455 : investigation of normal force distributions and wake

vortex characteristics of bodies of revolution at supersonic

speeds .

10 : 1262 : 4.808544773509208 : an extension of the linearized characteristics method

for calculating the supersonic flow around elliptic

cones .

QUERY : can the three-dimensional problem of a transverse potential flow about a body of revolution be reduced to a two-dimensional problem

Query parsed = [can, three-dimension, problem, a, transvers, potenti, flow, about, a, bodi, revolut, be, reduc, to, a, two-dimension, problem]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 1108 : 6.869277603374203 : a study of second-order supersonic flow theory .

2 : 1248 : 6.1054958638540135 : an analytic extension of the shock-expansion method .

3 : 410 : 6.099038440519991 : the supersonic flow about a blunt body of revolution

for gases at chemical equilibrium .

4 : 1301 : 6.087286031479132 : compressible boundary layers on bodies of revolution .

5 : 1281 : 6.0694433868978255 : turbulent heat transfer on blunt-nosed bodies in two-dimensional

and general three-dimensional hypersonic flow .

6 : 373 : 6.031291168965355 : the generalized expansion method and its application

to bodies travelling at high supersonic airspeeds .

7 : 1235 : 5.988579282422254 : a theory of the two dimensional laminar bounary layer

over a curved surface .

8 : 1224 : 5.935369887348261 : on the plk method and the supersonic blunt-body problem .

9 : 1255 : 5.897579147498766 : the flow about a charged body moving in the lower atmosphere .

10 : 933 : 5.860265208050855 : the characteristics of roughness from insects as observed

for two-dimensional, incompressible flow past airfoils .

QUERY : are experimental pressure distributions on bodies of revolution at angle of attack available

Query parsed = [ar, experiment, pressur, distribut, bodi, revolut, at, angl, attack, avail]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 498 : 5.106425935491723 : calculation of potential flow about bodies of revolution

having axes perpendicular to the free-stream direction .

2 : 234 : 4.765580271374075 : a second order shock-expansion method applicable to

bodies of revolution near zero lift .

3 : 248 : 4.587380525237686 : the application of lighthill formula for numerical

calculation of pressure distributions on bodies of

revolution at supersonic speed and zero angle of attack .

4 : 927 : 4.517154181800345 : investigation of normal force distributions and wake

vortex characteristics of bodies of revolution at supersonic

speeds .

5 : 197 : 4.359816394946078 : pressure distributions on three bodies of revolution

to determine the effect of reynolds number up to and

including the transonic speed range .

6 : 225 : 4.326482235431666 : elliptic cones alone and with wings at supersonic speeds .

7 : 56 : 4.147446077631733 : an analysis of the applicability of the hypersonic

similarity law to the study of the flow about bodies

of revolution at zero angle of attack .

8 : 1352 : 4.142444627487139 : aerodynamic investigation of a parabolic body of revolution

at mach number of 1. 92 and some effects of an annular

supersonic jet exhausting from the base .

9 : 232 : 4.138392845311076 : accuracy of approximate methods for predicting pressure

on pointed non-lifting bodies of revolution in supersonic

flow .

10 : 1231 : 4.132496171855669 : hypersonic flow over an elliptic cone: theory and experiment .

QUERY : does there exist a good basic treatment of the dynamics of re-entry combining consideration of realistic effects with relative simplicity of results

Query parsed = [doe, exist, a, good, basic, treatment, dynam, re-entri, combin, consider, realist, effect, rel, simplic, result]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 140 : 3.3820171951221005 : the determination of turbulent skin friction by means

of pitot tubes .

2 : 927 : 3.219185651435847 : investigation of normal force distributions and wake

vortex characteristics of bodies of revolution at supersonic

speeds .

3 : 82 : 3.175981356013868 : theoretical investigation of the ablation of a glass-type

heat protection shield of varied material properties

at the stagnation point of a re-entering irbm .

4 : 44 : 3.0394416064556724 : tip-bluntness effects on cone pressures at m=6.85.

5 : 416 : 3.0079318450941095 : methods of boundary-layer control for postponing and alleviating

buffeting and other effects of shock-induced separation .

6 : 1119 : 2.97313319001565 : plastic stability theory of thin shells .

7 : 274 : 2.9651484498811445 : analysis of quartz and teflon shields for a particular

re-entry mission .

8 : 453 : 2.947207265310127 : the influence of two-dimensional stream shear on airfoil maximum lift .

9 : 122 : 2.9295687052632173 : a simplified approximate method for the calculation of the pressure

around conical bodies of arbitrary shape in supersonic and hypersonic

flow .

10 : 328 : 2.914661860741621 : the boundary layer near the stagnation point in hypersonic

flow past a sphere .

QUERY : has anyone formally determined the influence of joule heating, produced by the induced current, in magnetohydrodynamic free convection flows under general conditions

Query parsed = [ha, anyon, formal, determin, influenc, joul, heat, produc, by, induc, current, magnetohydrodynam, free, convect, flow, under, gener, condit]

RANK : DOCUMENT : SCORE : HEADLINE

1 : 270 : 4.420134461307524 : on combined free and forced convection laminar magnetohydrodynamic

flow and heat transfer in channels with transverse

magnetic field .

2 : 44 : 4.364680777448901 : tip-bluntness effects on cone pressures at m=6.85.

3 : 625 : 4.100482099471995 : viscous and inviscid nonequilibrium gas flows .

4 : 87 : 4.03004339539102 : free-convection magnetohydrodynamic flow past a porous flat plate .

5 : 88 : 4.002785240877953 : magnetohydrodynamic free-convection pipe flow .

6 : 268 : 4.000558412048516 : several magnetohydrodynamic free-convection solutions .

7 : 131 : 3.9612675175612946 : two-dimensional jet mixing of a compressible fluid .

8 : 123 : 3.942928582575413 : the downstream influence of mass transfer at the nose

of a slender cone .

9 : 375 : 3.9173538200849065 : steady flow in the laminar boundary layer of a gas .

10 : 500 : 3.8888318280283642 : joule heating in magnetohydrodynamic free-convection

flows .