# Report

## Objective

To build a statistical retrieval system, using the inverted index created in Homework 2. This system returns the document that satisfy the natural language queries from the file.

## Description

The retrieval system will read a query, create an index out of it and determine score for each document by summing the tf-idf weight of each token in the index of the query, with that document. Two functions are given to calculate tf-idf weights. So two rankings of documents for each query is required to be generated.

Following are the two weighing function to calculate tf-idf weights:

Where,

*tf*: the frequency of the term in the document,

*maxtf*: the frequency of the most frequent indexed term in the document

*df*: the number of documents containing the term,

*doclen*: the length of the document, in words, counting stop words,

*avgdoclen*: the average document length in the collection, and

*collectionSize*: the number of documents in the collection

## Implementation

Following are the steps involved in the implementation of this retrieval system:

* Load the index and docInfo (which stores the docLen and maxF of each document in the cranfield).
* Take a query, create tokens from it, apply stemming using stemmer.java [1], and remove stop words.
* For each document in the crainfield collection sum the tf-idf weights if each token in the given query. This gives the score of a document with that query.
* Calculate score of each document with query. Arrange documents in decreasing order of score generating the ranking.
* Now generate ranking using second weighing function in the same manner.
* Display the results feting the document headline of the ranked documents.
* Do this for each query.

## Results

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q1: what similarity laws must be obeyed when constructing aeroelastic models of heated high speed aircraft

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 51 1.92 theory of aircraft structural models subjected to aerodynamic heating and external loads .

2 486 1.90 similarity laws for aerothermoelastic testing .

3 329 1.74 various aerodynamic characteristics in hypersonic rarefied gas flow .

4 12 1.63 some structural and aerelastic considerations of high speed flight .

5 573 1.59 viscous hypersonic similitude .

6 14 1.57 piston theory - a new aerodynamic tool for the aeroelastician .

7 184 1.56 scale models for thermo-aeroelastic research .

8 576 1.55 viscous and inviscid stagnation flow in a dissociated hypervelocity free stream .

9 1268 1.49 stable combustion of a high-velocity gas in a heated boundary layer .

10 1147 1.44 heat transfer to bodies traveling at high speed in the upper atmosphere .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 51 5.05 theory of aircraft structural models subjected to aerodynamic heating and external loads .

2 486 4.99 similarity laws for aerothermoelastic testing .

3 12 4.94 some structural and aerelastic considerations of high speed flight .

4 184 4.88 scale models for thermo-aeroelastic research .

5 573 4.87 viscous hypersonic similitude .

6 878 4.86 experimental model techniques and equipment for flutter investigations .

7 665 4.78 on the theory of hypersonic gas flow with a power law shock wave .

8 141 4.77 free-flight techniques for high speed aerodynamic research .

9 746 4.75 aeroelastic problems in connection with high speed flight .

10 944 4.75 one dimensional heat conduction through the skin of a vehicle upon entering a planetary atmosphere at constant velocity and entry angle .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q2: what are the structural and aeroelastic problems associated with flight of high speed aircraft

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 12 1.82 some structural and aerelastic considerations of high speed flight .

2 14 1.34 piston theory - a new aerodynamic tool for the aeroelastician .

3 51 1.29 theory of aircraft structural models subjected to aerodynamic heating and external loads .

4 746 1.25 aeroelastic problems in connection with high speed flight .

5 100 1.22 vibration isolation of aircraft power plants .

6 792 1.20 some low speed problems of high speed aircraft .

7 1169 1.17 hangling qualities experience with several vtol research aircraft .

8 172 1.14 some aerodynamic considerations of nozzle afterbody combination .

9 1380 1.14 the problem of obtaining high lift-drag ratios at supersonic speeds .

10 1263 1.10 turbulent heat transfer through a highly cooled, partially dissociated boundary layer .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 12 4.41 some structural and aerelastic considerations of high speed flight .

2 51 4.06 theory of aircraft structural models subjected to aerodynamic heating and external loads .

3 746 4.06 aeroelastic problems in connection with high speed flight .

4 1169 4.00 hangling qualities experience with several vtol research aircraft .

5 100 3.99 vibration isolation of aircraft power plants .

6 141 3.98 free-flight techniques for high speed aerodynamic research .

7 1089 3.98 aerodynamic characteristics of propeller-driven vtol aircraft .

8 14 3.96 piston theory - a new aerodynamic tool for the aeroelastician .

9 724 3.94 structural acoustic proof testing .

10 834 3.94 limit design for economical missile structures .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q3: what problems of heat conduction in composite slabs have been solved so far

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 144 1.57 heat flow in composite slabs .

2 485 1.45 linear heat flow in a composite slab .

3 1072 1.40 ignition and combustion in a laminar mixing zone .

4 91 1.38 periodic temperature distribution in a two-layer composite slab .

5 5 1.37 one-dimensional transient heat conduction into a double-layer slab subjected to a linear heat input for a small time internal .

6 90 1.30 periodic temperature distributions in a two-layer composite slab .

7 344 1.26 some experimental techniques in mass transfer cooling .

8 579 1.22 further developments of new methods in heat flow analysis .

9 542 1.21 biot's variational principle in heat conduction .

10 329 1.19 various aerodynamic characteristics in hypersonic rarefied gas flow .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 485 3.85 linear heat flow in a composite slab .

2 5 3.82 one-dimensional transient heat conduction into a double-layer slab subjected to a linear heat input for a small time internal .

3 144 3.81 heat flow in composite slabs .

4 399 3.71 conduction of heat in composite slabs .

5 91 3.68 periodic temperature distribution in a two-layer composite slab .

6 90 3.67 periodic temperature distributions in a two-layer composite slab .

7 181 3.64 some problems on heat conduction in stratiform bodies .

8 579 3.56 further developments of new methods in heat flow analysis .

9 542 3.55 biot's variational principle in heat conduction .

10 582 3.55 the melting of finite slabs .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q4: 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

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 166 2.52 flow of chemically reacting gas mixtures .

2 1061 2.50 turbulent mixing of a rocket exhaust jet with a supersonic stream including chemical reactions .

3 185 2.47 some possibilities of using gas mixtures other than in aerodynamic research .

4 488 2.43 a reaction-rate parameter for gasdynamics of a chemically reacting gas mixture .

5 329 2.28 various aerodynamic characteristics in hypersonic rarefied gas flow .

6 576 2.27 viscous and inviscid stagnation flow in a dissociated hypervelocity free stream .

7 24 2.26 theory of stagnation point heat transfer in dissociated air .

8 1315 2.22 performance estimates for the rae 6in . high-pressure shock tube .

9 110 2.19 dynamics of a dissociating gas .

10 575 2.16 atomic recombination in a hypersonic wind tunnel nozzle .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 488 8.37 a reaction-rate parameter for gasdynamics of a chemically reacting gas mixture .

2 166 8.31 flow of chemically reacting gas mixtures .

3 1275 8.19 flow about an unsteadily rotating disc .

4 1061 8.15 turbulent mixing of a rocket exhaust jet with a supersonic stream including chemical reactions .

5 185 8.15 some possibilities of using gas mixtures other than in aerodynamic research .

6 167 8.15 linearized flow of a dissociating gas .

7 1315 8.14 performance estimates for the rae 6in . high-pressure shock tube .

8 1189 8.13 nonequilibrium flow past a wedge .

9 1255 8.11 the flow about a charged body moving in the lower atmosphere .

10 1085 8.10 note on the convergence of numerical solutions of the navier-stokes equations .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q5: what chemical kinetic system is applicable to hypersonic aerodynamic problems

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 401 1.23 inviscid hypersonic airflows with coupled non-equilibrium processes .

2 103 1.21 theory of mixing and chemical reaction in the opposed jet diffusion flame .

3 625 1.12 viscous and inviscid nonequilibrium gas flows .

4 552 1.11 chemical kinetics of high temperature air .

5 1296 1.06 non-equilibrium expansions of air with coupled chemical reactions .

6 163 1.05 an analysis of the corridor and guidance requirements for supercircular entry planetary atmospheres .

7 1032 1.04 on the conservativeness of various distributed force systems .

8 968 1.01 rocket propulsion systems for interplanetary flight .

9 943 1.01 compressible free shear layer with finite initial thickness .

10 329 0.96 various aerodynamic characteristics in hypersonic rarefied gas flow .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 103 3.65 theory of mixing and chemical reaction in the opposed jet diffusion flame .

2 1032 3.60 on the conservativeness of various distributed force systems .

3 401 3.56 inviscid hypersonic airflows with coupled non-equilibrium processes .

4 552 3.56 chemical kinetics of high temperature air .

5 968 3.54 rocket propulsion systems for interplanetary flight .

6 943 3.54 compressible free shear layer with finite initial thickness .

7 1296 3.54 non-equilibrium expansions of air with coupled chemical reactions .

8 355 3.49 the injection of air into the dissociated hypersonic laminar boundary layer .

9 625 3.49 viscous and inviscid nonequilibrium gas flows .

10 488 3.48 a reaction-rate parameter for gasdynamics of a chemically reacting gas mixture .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q6: what theoretical and experimental guides do we have as to turbulent couette flow behaviour

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 798 1.48 interaction between shock waves and boundary layers, with a note on the effects of the interaction of the performance of supersonic intakes .

2 315 1.38 scale effects at high subsonic and transonic speeds and methods for fixing transition in model experiments .

3 491 1.31 on the close relationship between turbulent plane-couette and pressure flows .

4 344 1.23 some experimental techniques in mass transfer cooling .

5 640 1.22 the design of structures to resist jet noise fatigue .

6 257 1.21 on turbulen flow between parallel plates .

7 99 1.19 the fundamentals of the statistical theory of turbulence .

8 72 1.16 boundary layer behind shock or thin expansion wave moving into stationary fluid .

9 522 1.15 laminar, transitional and turbulent heat transfer to a cone-cylinder-flare body at mach 8. 0.

10 329 1.15 various aerodynamic characteristics in hypersonic rarefied gas flow .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 491 4.43 on the close relationship between turbulent plane-couette and pressure flows .

2 950 4.29 comparison of theoretical and experimental creep buckling times of initially straight, centrally loaded columns .

3 386 4.28 a generalised porous-wall ?couette type? flow .

4 257 4.28 on turbulen flow between parallel plates .

5 121 4.27 a theory for base pressures in transonic and supersonic flow .

6 385 4.26 on a generalised porous-wall ?couette type? flow .

7 315 4.26 scale effects at high subsonic and transonic speeds and methods for fixing transition in model experiments .

8 891 4.25 buckling of a finite length cylindrical shell under a circumferential band of pressure .

9 798 4.24 interaction between shock waves and boundary layers, with a note on the effects of the interaction of the performance of supersonic intakes .

10 287 4.23 some theoretical low-speed loading characteristics of swept wings in roll and sideslip .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q7: 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

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 492 2.48 prediction of ogive-forebody pressures at angles of attack .

2 122 2.05 a simplified approximate method for the calculation of the pressure around conical bodies of arbitrary shape in supersonic and hypersonic flow .

3 1040 1.94 on transverse vibrations of thin, shallow elastic shells .

4 434 1.87 contributions of the wing panels to the forces and moments of supersonic wing-body combinations at combined angles .

5 373 1.83 the generalized expansion method and its application to bodies travelling at high supersonic airspeeds .

6 57 1.82 applicability of the hypersonic similarity rule to pressure distributions which include the effects of rotation for bodies of revolution at zero angle of attack .

7 124 1.81 a summary of the supersonic pressure drag of bodies of revolution .

8 56 1.80 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 .

9 1381 1.78 effect of mach number on boundary layer transition in the presence of pressure rise and surface roughness on an ogive-cylinder body with cold wall conditions .

10 232 1.76 accuracy of approximate methods for predicting pressure on pointed non-lifting bodies of revolution in supersonic flow .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 492 7.16 prediction of ogive-forebody pressures at angles of attack .

2 122 6.65 a simplified approximate method for the calculation of the pressure around conical bodies of arbitrary shape in supersonic and hypersonic flow .

3 57 6.56 applicability of the hypersonic similarity rule to pressure distributions which include the effects of rotation for bodies of revolution at zero angle of attack .

4 973 6.55 interaction effects produced by jet exhausting laterally near base of ogive-cylinder model in supersonic main stream .

5 434 6.53 contributions of the wing panels to the forces and moments of supersonic wing-body combinations at combined angles .

6 56 6.52 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 .

7 1231 6.51 hypersonic flow over an elliptic cone: theory and experiment .

8 124 6.51 a summary of the supersonic pressure drag of bodies of revolution .

9 232 6.47 accuracy of approximate methods for predicting pressure on pointed non-lifting bodies of revolution in supersonic flow .

10 801 6.43 experimental study of the equivalence of transonic flow about slender cone-cylinders of circular and elliptic cross section .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q8: what methods -dash exact or approximate -dash are presently available for predicting body pressures at angle of attack

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 122 1.61 a simplified approximate method for the calculation of the pressure around conical bodies of arbitrary shape in supersonic and hypersonic flow .

2 688 1.43 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 .

3 234 1.43 a second order shock-expansion method applicable to bodies of revolution near zero lift .

4 433 1.40 application of two dimensional vortex theory to the prediction of flow fields behind wings of wing-body combinations at subsonic and supersonic speeds .

5 947 1.36 static aerodynamic characteristics of a short blunt 10 semi-vertex angle cone at a mach number of 15 in helium .

6 1231 1.36 hypersonic flow over an elliptic cone: theory and experiment .

7 492 1.36 prediction of ogive-forebody pressures at angles of attack .

8 69 1.32 predicted shock envelopes about two types of vehicles at large angles of attack .

9 292 1.31 rapid laminar boundary layer calculations by piece-wise application of similar solutions .

10 1307 1.31 laminar heat-transfer and pressure measurements at a mach number of 6 on sharp and blunt 15 half-angle cones at angles of attack up to 90 .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 122 5.79 a simplified approximate method for the calculation of the pressure around conical bodies of arbitrary shape in supersonic and hypersonic flow .

2 492 5.78 prediction of ogive-forebody pressures at angles of attack .

3 69 5.69 predicted shock envelopes about two types of vehicles at large angles of attack .

4 1231 5.68 hypersonic flow over an elliptic cone: theory and experiment .

5 688 5.67 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 .

6 248 5.65 the application of lighthill formula for numerical calculation of pressure distributions on bodies of revolution at supersonic speed and zero angle of attack .

7 234 5.64 a second order shock-expansion method applicable to bodies of revolution near zero lift .

8 232 5.62 accuracy of approximate methods for predicting pressure on pointed non-lifting bodies of revolution in supersonic flow .

9 124 5.60 a summary of the supersonic pressure drag of bodies of revolution .

10 947 5.60 static aerodynamic characteristics of a short blunt 10 semi-vertex angle cone at a mach number of 15 in helium .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q9: papers on internal /slip flow/ heat transfer studies

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 550 1.15 laminar heat transfer in tubes under slip-flow conditions .

2 45 1.08 an investigation of separated flows, part ii: flow in the cavity and heat transfer .

3 571 1.02 heat transfer to flat plate in high temperature rarefied ultra-high mach number flow .

4 21 0.96 on heat transfer in slip flow .

5 22 0.95 on slip-flow heat transfer to a flat plate .

6 306 0.95 second approximation to laminar compressible boundary layer on flat plate in slip flow .

7 1215 0.90 the effect of slip particularly for highly cooled walls .

8 270 0.89 on combined free and forced convection laminar magnetohydrodynamic flow and heat transfer in channels with transverse magnetic field .

9 572 0.87 boundary layer displacement and leading edge bluntness effects in high temperature hypersonic flow .

10 1204 0.87 experimental effect of bluntness and gas rarefaction on drag coefficients and stagnation heat transfer on axisymmetric shapes in hypersonic flow .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 550 3.30 laminar heat transfer in tubes under slip-flow conditions .

2 45 3.22 an investigation of separated flows, part ii: flow in the cavity and heat transfer .

3 21 3.20 on heat transfer in slip flow .

4 22 3.18 on slip-flow heat transfer to a flat plate .

5 571 3.17 heat transfer to flat plate in high temperature rarefied ultra-high mach number flow .

6 306 3.15 second approximation to laminar compressible boundary layer on flat plate in slip flow .

7 102 3.15 advantages and limitations of models .

8 1215 3.13 the effect of slip particularly for highly cooled walls .

9 270 3.10 on combined free and forced convection laminar magnetohydrodynamic flow and heat transfer in channels with transverse magnetic field .

10 398 3.07 heat transfer in turbulent shear flow .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q10: are real-gas transport properties for air available over a wide range of enthalpies and densities

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 493 2.10 real-gas laminar boundary layer skin friction and heat transfer .

2 302 1.82 approximations for the thermodynamic and transport properties of high temperature air .

3 1199 1.72 theoretical investigations of a supersonic laminar boundary layer with foreign-gas injection .

4 1143 1.68 a one-foot hypervelocity shock tunnel in which high-enthalpy real gas flows can be generated with flow times of about 180 milliseconds .

5 110 1.65 dynamics of a dissociating gas .

6 329 1.64 various aerodynamic characteristics in hypersonic rarefied gas flow .

7 949 1.62 charts for equilibrium flow properties of air in hypervelocity nozzles .

8 1274 1.58 real gas effects in flow over blunt bodies at hypersonic speeds .

9 1319 1.58 real gas effects in flow over blunt bodies at hypersonic speeds .

10 332 1.55 similitude of hypersonic real-gas flows over slender bodies with blunted noses .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 493 5.49 real-gas laminar boundary layer skin friction and heat transfer .

2 302 5.46 approximations for the thermodynamic and transport properties of high temperature air .

3 1143 5.38 a one-foot hypervelocity shock tunnel in which high-enthalpy real gas flows can be generated with flow times of about 180 milliseconds .

4 949 5.36 charts for equilibrium flow properties of air in hypervelocity nozzles .

5 1199 5.29 theoretical investigations of a supersonic laminar boundary layer with foreign-gas injection .

6 524 5.27 stagnation point heat transfer in partially ionized air .

7 1010 5.25 free-flight measurements of the static and dynamic

8 691 5.25 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 .

9 1286 5.23 equilibrium real-gas performance charts for a shypersonic shock-tube wind-tunnel employing nitrogen .

10 1009 5.22 free-flight measurements of the static and dynamic

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q11: is it possible to find an analytical, similar solution of the strong blast wave problem in the newtonian approximation

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 495 2.02 on similar solutions for strong blast waves and their application to steady hypersonic flow .

2 572 1.61 boundary layer displacement and leading edge bluntness effects in high temperature hypersonic flow .

3 25 1.57 inviscid hypersonic flow over blunt-nosed slender bodies .

4 72 1.53 boundary layer behind shock or thin expansion wave moving into stationary fluid .

5 110 1.48 dynamics of a dissociating gas .

6 262 1.45 the formation of a blast wave by a very intense explosion .

7 1356 1.44 secondary flow fields embedded in hypersonic shock layers .

8 556 1.44 numerical comparison between exact and approximate theories of hypersonic inviscid flow past slender blunt nosed bodies .

9 1248 1.42 an analytic extension of the shock-expansion method .

10 1280 1.42 wings with minimum drag due to lift in supersonic flow .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 495 5.64 on similar solutions for strong blast waves and their application to steady hypersonic flow .

2 556 5.24 numerical comparison between exact and approximate theories of hypersonic inviscid flow past slender blunt nosed bodies .

3 472 5.23 waves in supersonic flow .

4 654 5.21 on the propagation and structure of the blast wave . part 1.

5 72 5.21 boundary layer behind shock or thin expansion wave moving into stationary fluid .

6 1186 5.20 lift of slender delta wings according to newtonian theory .

7 28 5.19 a note on the explosion solution of sedov with application to the newtonian theory of unsteady hypersonic flow .

8 1327 5.18 on the propagation and structure of the blast wave .

9 305 5.18 hypersonic strong viscous interaction on a flat plate with surface mass transfer .

10 738 5.16 finding zero's of arbitrary functions .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q12: how can the aerodynamic performance of channel flow ground effect machines be calculated

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 624 1.66 cruise performance of channel-flow ground effect machines .

2 649 1.29 the hovercraft - a new concept in maritime transport .

3 966 1.28 on fully developed channel flows,. some solutions and limitations, and effects of compressibility, variable properties, and body forces .

4 704 1.23 a systematic kernel function procedure for determining aerodynamic forces on oscillating or steady finite wings at subsonic speeds .

5 650 1.20 some design problems of hovercraft .

6 329 1.15 various aerodynamic characteristics in hypersonic rarefied gas flow .

7 792 1.13 some low speed problems of high speed aircraft .

8 506 1.13 a note on havelock's shallow-water wave-resistance curves .

9 1164 1.09 effect of ground proximity on the aerodynamic characteristics of a four- engined vertical take-off and landing transport airplane model with tilting wing and propellers .

10 325 1.06 heat transfer to constant property laminar boundary layer flows with power function free stream velocity and wall temperature variation .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 624 4.19 cruise performance of channel-flow ground effect machines .

2 650 4.13 some design problems of hovercraft .

3 506 4.00 a note on havelock's shallow-water wave-resistance curves .

4 966 4.00 on fully developed channel flows,. some solutions and limitations, and effects of compressibility, variable properties, and body forces .

5 649 3.99 the hovercraft - a new concept in maritime transport .

6 704 3.92 a systematic kernel function procedure for determining aerodynamic forces on oscillating or steady finite wings at subsonic speeds .

7 1221 3.92 steady flow of conducting fluids in channels under transverse magnetic fields, with consideration of hall effect .

8 941 3.91 viscous compressible and incompressible flow in slender channels .

9 1232 3.89 the curtain jet .

10 543 3.89 the stacking of compressor stage characteristics to give an overall compressor performance map .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q13: what is the basic mechanism of the transonic aileron buzz

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 496 1.85 a theory of transonic aileron buzz, neglecting viscous effects .

2 903 1.30 two dimensional transonic unsteady flow with shock waves .

3 520 1.20 wing-tail interference as a cause of 'magnus' effects on a finned missile .

4 199 1.17 measurement of two dimensional derivatives on a wing-aileron-tab system .

5 643 1.04 an investigation of wing-aileron flutter using ground launched rocket models .

6 797 1.02 a study of the effect of leading-edge modifications on the flow over a 50degree sweptback wing at transonic speeds .

7 660 1.01 the fundamental solution for small steady three dimensional disturbances to a two dimensional parallel shear flow .

8 1268 1.00 stable combustion of a high-velocity gas in a heated boundary layer .

9 440 0.94 compilation of information on the transonic attachment of flows at the leading edge of airfoils .

10 1242 0.93 some considerations on the laminar stability of time-dependent basic flows .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 496 2.74 a theory of transonic aileron buzz, neglecting viscous effects .

2 903 2.39 two dimensional transonic unsteady flow with shock waves .

3 520 2.34 wing-tail interference as a cause of 'magnus' effects on a finned missile .

4 643 2.31 an investigation of wing-aileron flutter using ground launched rocket models .

5 313 2.29 on alternative forms for the basic equations of transonic flow theory .

6 199 2.29 measurement of two dimensional derivatives on a wing-aileron-tab system .

7 440 2.29 compilation of information on the transonic attachment of flows at the leading edge of airfoils .

8 38 2.27 on the prediction of mixed subsonic/supersonic pressure distributions .

9 880 2.25 the design and testing of supersonic flutter models .

10 415 2.21 the aerodynamic design of section shapes for swept wings .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q14: papers on shock-sound wave interaction

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 64 1.06 unsteady oblique interaction of a shock wave with plane disturbances .

2 798 1.04 interaction between shock waves and boundary layers, with a note on the effects of the interaction of the performance of supersonic intakes .

3 132 0.99 viscosity effects in sound waves of finite amplitude: in survey in mechanics .

4 170 0.97 the interaction of a reflected shock wave with the boundary layer in a shock tube .

5 296 0.91 notes on waves through gases at pressures small compared with the magnetic pressure, with applications to upper atmosphere aerodynamics .

6 402 0.89 magnetohydrodynamics shocks .

7 1364 0.88 an experimental investigation of the interaction between shock waves and boundary layers .

8 439 0.88 a factor affecting transonic leading edge flow separation .

9 572 0.87 boundary layer displacement and leading edge bluntness effects in high temperature hypersonic flow .

10 256 0.86 an experimental study of the glancing interaction between a shock wave and a turbulent boundary layer .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 64 2.53 unsteady oblique interaction of a shock wave with plane disturbances .

2 132 2.38 viscosity effects in sound waves of finite amplitude: in survey in mechanics .

3 170 2.38 the interaction of a reflected shock wave with the boundary layer in a shock tube .

4 402 2.37 magnetohydrodynamics shocks .

5 439 2.35 a factor affecting transonic leading edge flow separation .

6 256 2.34 an experimental study of the glancing interaction between a shock wave and a turbulent boundary layer .

7 335 2.34 the interaction between boundary layer and shock waves in transonic flow .

8 65 2.33 convection of a pattern of vorticity through a shock wave .

9 798 2.33 interaction between shock waves and boundary layers, with a note on the effects of the interaction of the performance of supersonic intakes .

10 1364 2.33 an experimental investigation of the interaction between shock waves and boundary layers .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q15: material properties of photoelastic materials

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 462 1.07 photo-thermoelasticity .

2 82 0.76 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 1025 0.76 note on creep buckling of columns .

4 463 0.74 physical properties of plastics for photo-thermoelastic investigation .

5 542 0.71 biot's variational principle in heat conduction .

6 1043 0.69 on transverse vibrations of thin, shallow elastic shells .

7 1097 0.66 experimental ablation cooling .

8 1024 0.63 note on creep buckling of columns .

9 1127 0.63 the buckling of sandwich type panels .

10 1340 0.63 method of controlling stiffness properties of a solid-construction model wing .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 462 1.66 photo-thermoelasticity .

2 463 1.48 physical properties of plastics for photo-thermoelastic investigation .

3 1025 1.46 note on creep buckling of columns .

4 1099 1.45 a theoretical study of stagnation point ablation .

5 542 1.43 biot's variational principle in heat conduction .

6 82 1.43 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 .

7 1043 1.43 on transverse vibrations of thin, shallow elastic shells .

8 1340 1.42 method of controlling stiffness properties of a solid-construction model wing .

9 1065 1.40 a free-flight investigation of ablation of a blunt body to a mach number of 13 .1.

10 817 1.39 loading paths and the incremental stress law .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q16: can the transverse potential flow about a body of revolution be calculated efficiently by an electronic computer

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 498 1.89 calculation of potential flow about bodies of revolution having axes perpendicular to the free-stream direction .

2 1255 1.59 the flow about a charged body moving in the lower atmosphere .

3 927 1.56 investigation of normal force distributions and wake vortex characteristics of bodies of revolution at supersonic speeds .

4 976 1.51 turbulent diffusion in the wake of a blunt nosed body at hypersonic speeds .

5 1328 1.46 the production of aerodynamic forces by heat addition on external surfaces of aircraft .

6 266 1.40 exact solution of the neumann problem . calculation for non- circulatory plane and axially symmetric flows about or within arbitrary boundaries .

7 869 1.37 the calculation of transient temperature in turbine blades and tapered discs using biot's variational method .

8 231 1.31 practical calculation of second-order supersonic flow past non-lifting bodies of revolution .

9 704 1.31 a systematic kernel function procedure for determining aerodynamic forces on oscillating or steady finite wings at subsonic speeds .

10 106 1.29 the transverse potential flow past a body of revolution .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 498 5.14 calculation of potential flow about bodies of revolution having axes perpendicular to the free-stream direction .

2 1255 4.94 the flow about a charged body moving in the lower atmosphere .

3 106 4.92 the transverse potential flow past a body of revolution .

4 231 4.86 practical calculation of second-order supersonic flow past non-lifting bodies of revolution .

5 1328 4.83 the production of aerodynamic forces by heat addition on external surfaces of aircraft .

6 494 4.79 axisymmetric viscous flow plast very slender bodies of revolution .

7 248 4.78 the application of lighthill formula for numerical calculation of pressure distributions on bodies of revolution at supersonic speed and zero angle of attack .

8 410 4.78 the supersonic flow about a blunt body of revolution for gases at chemical equilibrium .

9 266 4.77 exact solution of the neumann problem . calculation for non- circulatory plane and axially symmetric flows about or within arbitrary boundaries .

10 976 4.77 turbulent diffusion in the wake of a blunt nosed body at hypersonic speeds .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q17: can the three-dimensional problem of a transverse potential flow about a body of revolution be reduced to a two-dimensional problem

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 1108 1.62 a study of second-order supersonic flow theory .

2 94 1.46 the transverse curvature effect in compressible axially symmetric laminar boundary layer flow .

3 1301 1.40 compressible boundary layers on bodies of revolution .

4 1281 1.39 turbulent heat transfer on blunt-nosed bodies in two-dimensional and general three-dimensional hypersonic flow .

5 916 1.38 the flow around oscillating low aspect ratio wings at transonic speeds .

6 373 1.38 the generalized expansion method and its application to bodies travelling at high supersonic airspeeds .

7 498 1.37 calculation of potential flow about bodies of revolution having axes perpendicular to the free-stream direction .

8 927 1.37 investigation of normal force distributions and wake vortex characteristics of bodies of revolution at supersonic speeds .

9 801 1.35 experimental study of the equivalence of transonic flow about slender cone-cylinders of circular and elliptic cross section .

10 266 1.32 exact solution of the neumann problem . calculation for non- circulatory plane and axially symmetric flows about or within arbitrary boundaries .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 1108 5.75 a study of second-order supersonic flow theory .

2 106 5.72 the transverse potential flow past a body of revolution .

3 498 5.67 calculation of potential flow about bodies of revolution having axes perpendicular to the free-stream direction .

4 916 5.66 the flow around oscillating low aspect ratio wings at transonic speeds .

5 1301 5.66 compressible boundary layers on bodies of revolution .

6 336 5.66 simplified laminar boundary layer calculations for bodies of revolution and for yawed wings .

7 700 5.63 two and three-dimensional unsteady lift problems in high speed flight .

8 1281 5.63 turbulent heat transfer on blunt-nosed bodies in two-dimensional and general three-dimensional hypersonic flow .

9 1036 5.62 on transverse vibrations of thin, shallow elastic shells .

10 801 5.62 experimental study of the equivalence of transonic flow about slender cone-cylinders of circular and elliptic cross section .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q18: are experimental pressure distributions on bodies of revolution at angle of attack available

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 248 1.27 the application of lighthill formula for numerical calculation of pressure distributions on bodies of revolution at supersonic speed and zero angle of attack .

2 197 1.26 pressure distributions on three bodies of revolution to determine the effect of reynolds number up to and including the transonic speed range .

3 927 1.23 investigation of normal force distributions and wake vortex characteristics of bodies of revolution at supersonic speeds .

4 234 1.22 a second order shock-expansion method applicable to bodies of revolution near zero lift .

5 56 1.16 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 .

6 498 1.16 calculation of potential flow about bodies of revolution having axes perpendicular to the free-stream direction .

7 225 1.13 elliptic cones alone and with wings at supersonic speeds .

8 801 1.11 experimental study of the equivalence of transonic flow about slender cone-cylinders of circular and elliptic cross section .

9 1352 1.09 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 .

10 122 1.08 a simplified approximate method for the calculation of the pressure around conical bodies of arbitrary shape in supersonic and hypersonic flow .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 197 4.51 pressure distributions on three bodies of revolution to determine the effect of reynolds number up to and including the transonic speed range .

2 248 4.51 the application of lighthill formula for numerical calculation of pressure distributions on bodies of revolution at supersonic speed and zero angle of attack .

3 498 4.48 calculation of potential flow about bodies of revolution having axes perpendicular to the free-stream direction .

4 234 4.44 a second order shock-expansion method applicable to bodies of revolution near zero lift .

5 56 4.43 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 .

6 492 4.42 prediction of ogive-forebody pressures at angles of attack .

7 1352 4.41 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 .

8 801 4.41 experimental study of the equivalence of transonic flow about slender cone-cylinders of circular and elliptic cross section .

9 1231 4.41 hypersonic flow over an elliptic cone: theory and experiment .

10 927 4.41 investigation of normal force distributions and wake vortex characteristics of bodies of revolution at supersonic speeds .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q19: does there exist a good basic treatment of the dynamics of re-entry combining consideration of realistic effects with relative simplicity of results

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 82 2.30 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 .

2 140 2.00 the determination of turbulent skin friction by means of pitot tubes .

3 1313 2.00 on the flow in a reflected shock tunnel .

4 164 1.97 an approximate analytical method for studying entry into planetary atospheres .

5 163 1.94 an analysis of the corridor and guidance requirements for supercircular entry planetary atmospheres .

6 1239 1.91 body under lifting wing .

7 1291 1.90 atmosphere entries with spacecraft lift-drag ratios modulated to limit decelerations .

8 433 1.89 application of two dimensional vortex theory to the prediction of flow fields behind wings of wing-body combinations at subsonic and supersonic speeds .

9 927 1.86 investigation of normal force distributions and wake vortex characteristics of bodies of revolution at supersonic speeds .

10 673 1.86 investigation of full scale split trailing edge wing flaps with various chords and hinge locations .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 82 6.52 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 .

2 1346 6.45 modulated entry .

3 554 6.40 generalized heat transfer formulas and graphs .

4 706 6.39 on som reciprocal relations in the theory of nonstationary flows .

5 164 6.38 an approximate analytical method for studying entry into planetary atospheres .

6 453 6.37 the influence of two-dimensional stream shear on airfoil maximum lift .

7 1219 6.37 determination of lift or drag programs to minimize re-entry heating .

8 716 6.36 study of the oscillatory motion of manned vehicles entering the earth's atmosphere .

9 1279 6.35 sublimation in a hypersonic environment .

10 353 6.35 the effect of helium injection at an axially symmetric stagnation point .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Q20: has anyone formally determined the influence of joule heating, produced by the induced current, in magnetohydrodynamic free convection flows under general conditions

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 500 2.79 joule heating in magnetohydrodynamic free-convection flows .

2 270 2.41 on combined free and forced convection laminar magnetohydrodynamic flow and heat transfer in channels with transverse magnetic field .

3 268 2.31 several magnetohydrodynamic free-convection solutions .

4 798 2.16 interaction between shock waves and boundary layers, with a note on the effects of the interaction of the performance of supersonic intakes .

5 329 2.14 various aerodynamic characteristics in hypersonic rarefied gas flow .

6 44 2.12 tip-bluntness effects on cone pressures at m=6.85.

7 1239 2.11 body under lifting wing .

8 721 2.10 near noise field of a jet engine exhaust .

9 77 2.10 a comparative analysis of the performance of long range hypervelocity vehicles .

10 244 2.08 an improved smoke generator for use in the visualisation of airflow, particularly boundary layer flow at high reynolds numbers .

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Using Weighing Function 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Rank DocId Score Document Headline

1 500 7.82 joule heating in magnetohydrodynamic free-convection flows .

2 268 7.51 several magnetohydrodynamic free-convection solutions .

3 270 7.41 on combined free and forced convection laminar magnetohydrodynamic flow and heat transfer in channels with transverse magnetic field .

4 88 7.35 magnetohydrodynamic free-convection pipe flow .

5 87 7.29 free-convection magnetohydrodynamic flow past a porous flat plate .

6 450 7.25 some physical interpretations of magnetohydrodynamic duct flows .

7 396 7.19 variational and lagrangian thermodynamics of thermal convection-fundamental shortcomings of the heat transfer coefficient .

8 407 7.19 stationary convection flow of an electrically conducting liquid between parallel plates in a magnetic field .

9 584 7.18 conduction of heat in a solid with a power law of heat transfer at its surface .

10 408 7.18 on convective motion of a conducting fluid between parallel vertical plates in a magnetic field .

Total time taken : 6.90 secs

## Conclusion

Using both the ranking of documents is almost similar with few exceptions. Some documents receives different ranks using both functions because of the different variables in two equations.

The document having more keywords of the query will get the higher ranking due to more score/weight as weighing function contains the term frequency in the numerator of the weighing function.

Following is the explanation regarding the relevance and non-relevance of documents in the query result.

**Q1:** Original query: what similarity laws must be obeyed when constructing aeroelastic models of heated high speed aircraft.

**Relevant Documents**

1. DOC ID - 486
2. DOC ID - 51
3. DOC ID - 573

**Non-relevant Documents**

1. DOC ID - 14
2. DOC ID - 665
3. DOC ID - 329
4. DOC ID - 878
5. DOC ID - 576

The top ranked documents such as DOC ID 329, 576 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q2:** what are the structural and aeroelastic problems associated with flight of high speed aircraft

**Relevant Documents**

1. DOC ID - 12
2. DOC ID - 1380
3. DOC ID - 172

**Non-relevant Documents**

1. DOC ID - 51
2. DOC ID - 1263
3. DOC ID - 486

The top ranked documents such as DOC ID 14, 486 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q3:** what problems of heat conduction in composite slabs have been solved so far.

**Relevant Documents**

1. DOC ID - 144
2. DOC ID - 1072
3. DOC ID - 399
4. DOC ID - 485

**Non-relevant Documents**

1. DOC ID - 344
2. DOC ID - 579
3. DOC ID - 625

The top ranked documents such as DOC ID 344, 579 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q4:** 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 Documents**

1. DOC ID - 1061
2. DOC ID - 166
3. DOC ID - 488

**Non-relevant Documents**

1. DOC ID - 575
2. DOC ID - 24

The top ranked documents such as DOC ID 44, 575 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q5:** what chemical kinetic system is applicable to hypersonic aerodynamic problems

**Relevant Documents**

1. DOC ID - 401
2. DOC ID - 625
3. DOC ID - 163

**Non-relevant Documents**

1. DOC ID - 344
2. DOC ID - 342

The top ranked documents such as DOC ID 344, 342 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q6:** what theoretical and experimental guides do we have as to turbulent couette flow behaviour

**Relevant Documents**

1. DOC ID - 798
2. DOC ID - 315
3. DOC ID - 121
4. DOC ID - 491

**Non-relevant Documents**

1. DOC ID - 294
2. DOC ID - 297
3. DOC ID - 315

The top ranked documents such as DOC ID 294, 297 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q7:** 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 Documents**

1. DOC ID - 492
2. DOC ID - 434
3. DOC ID - 373

**Non-relevant Documents**

1. DOC ID - 122
2. DOC ID - 1104
3. DOC ID - 381

The top ranked documents such as DOC ID 122,381 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q8:** what methods -dash exact or approximate -dash are presently available for predicting body pressures at angle of attack

**Relevant Documents**

1. DOC ID - 688
2. DOC ID - 422
3. DOC ID - 191
4. DOC ID - 433

**Non-relevant Documents**

1. DOC ID - 234
2. DOC ID - 1231

The top ranked documents such as DOC ID 234, 1231 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q9:** papers on internal /slip flow/ heat transfer studies

**Relevant Documents**

1. DOC ID - 550
2. DOC ID - 45

**Non-relevant Documents**

1. DOC ID - 21
2. DOC ID - 89
3. DOC ID - 306

The top ranked documents such as DOC ID 21, 89 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q10:** are real-gas transport properties for air available over a wide range of enthalpies and densities

**Relevant Documents**

1. DOC ID - 302
2. DOC ID - 1010
3. DOC ID - 949

**Non-relevant Documents**

1. DOC ID - 330
2. DOC ID - 1214

The top ranked documents such as DOC ID 330, 1214 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q11:** is it possible to find an analytical, similar solution of the strong blast wave problem in the newtonian approximation

**Relevant Documents**

1. DOC ID - 495
2. DOC ID - 572
3. DOC ID - 72

**Non-relevant Documents**

1. DOC ID - 28
2. DOC ID - 305
3. DOC ID - 556

The top ranked documents such as DOC ID 28, 305 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q12:** how can the aerodynamic performance of channel flow ground effect machines be calculated

**Relevant Documents**

1. DOC ID - 624
2. DOC ID - 966
3. DOC ID - 650
4. DOC ID - 506

**Non-relevant Documents**

1. DOC ID - 325
2. DOC ID - 650
3. DOC ID - 792

The top ranked documents such as DOC ID 325, 650 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q13**: what is the basic mechanism of the transonic aileron buzz

**Relevant Documents**

1. DOC ID - 496
2. DOC ID - 503
3. DOC ID - 920

**Non-relevant Documents**

1. DOC ID - 880
2. DOC ID - 927

The top ranked documents such as DOC ID 880, 927 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q14:** papers on shock-sound wave interaction

**Relevant Documents**

1. DOC ID - 170
2. DOC ID - 798
3. DOC ID - 439

Non-relevant Documents

1. DOC ID - 329
2. DOC ID - 572

The top ranked documents such as DOC ID 329, 572 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q15:** material properties of photoelastic materials

**Relevant Documents**

1. DOC ID - 462
2. DOC ID - 463

Non-relevant Documents

1. DOC ID - 1065
2. DOC ID - 1099
3. DOC ID - 1127

The top ranked documents such as DOC ID 1064, 1099 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q16**: can the transverse potential flow about a body of revolution be calculated efficiently by an electronic computer

**Relevant Documents**

1. DOC ID - 498
2. DOC ID - 927
3. DOC ID - 1255

**Non-relevant Documents**

1. DOC ID - 704
2. DOC ID - 1255

The top ranked documents such as DOC ID 704, 1255 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q17:** can the three-dimensional problem of a transverse potential flow about a body of revolution be reduced to a two-dimensional problem

Relevant Documents

1. DOC ID - 1108
2. DOC ID - 927

Non-relevant Documents

1. DOC ID - 786
2. DOC ID - 1255
3. DOC ID - 1043

The top ranked documents such as DOC ID 786, 1255 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q18**: are experimental pressure distributions on bodies of revolution at angle of attack available

**Relevant Documents**

1. DOC ID - 197
2. DOC ID - 234
3. DOC ID - 248
4. DOC ID - 56

**Non-relevant Documents**

1. DOC ID - 1352
2. DOC ID - 225

The top ranked documents such as DOC ID 1355, 225 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q19:** 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**

1. DOC ID - 140
2. DOC ID - 927

**Non-relevant Documents**

1. DOC ID - 416
2. DOC ID - 328
3. DOC ID - 344

The top ranked documents such as DOC ID 328, 344 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

**Q20**: has anyone formally determined the influence of joule heating, produced by the induced current, in magneto hydrodynamic free convection flows under general conditions

**Relevant Documents**

1. DOC ID - 500
2. DOC ID - 268
3. DOC ID - 244

**Non-relevant Documents**

1. DOC ID - 625
2. DOC ID - 87
3. DOC ID - 123

The top ranked documents such as DOC ID 625, 87 are ranked higher though they are non-relevant because these documents contain higher Term Frequency (TF) of the terms present in the query.

## References

1. <http://chianti.ucsd.edu/svn/csplugins/trunk/soc/layla/WordCloudPlugin/trunk/WordCloud/src/cytoscape/csplugins/wordcloud/Stemmer.java>
2. <http://jsoup.org/>

## Submitted By

Abhishek Gupta (axg137230)