Information Retrieval CS6322.001 Assignment 3 (Relevance model) Report

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Some ***important Information*** regarding ***tokenization*** are:

- The program Removes all the SGML Tags from the Cranfield documents.
- All the words are converted into lower-case.
- The program removes all the dashes between the words and splits into two different words.
- The program removes punctuation marks, Removes comma and hyphen, replaces with space.
- The Possessives (') are also removed using the preprocess() function created in the program.
- Acronyms containing . are also removed and converted into a single token.

Lemmatization:

I have used open source WordNet Lemmatizer (Python library) of NLTK for the Lemmatization of the tokens from the Cranfield documents. The stopwords are removed from the token before performing Lemmatization

Solution 1 & Solution 2: They are displayed as the console output in the end

Solution 3:

Weighting Scheme 1

Query Number	Relevant Documents (Doc ID)	Non-Relevant Documents (Doc ID)
1	238, 429, 430	879, 509
2	429, 238, 1158	12, 430
3	5, 485, 181, 509	281
4	1085, 1221	1123, 320, 437
5	1305, 320, 650, 925	1032
6	271, 1146, 1045	137, 385
7	492, 3	973, 430, 312
8	492, 1083, 1306, 248	231
9	507, 21	398, 1152, 326,
10	405, 436, 438, 524	482
11	320, 495, 1152	670, 920
12	650, 592	506, 339, 925
13	879, 880, 38	496, 258
14	291, 1317, 326, 1140	609
15	509, 1096, 592, 119	1099
16	1358, 920	161, 106, 339
17	298, 320, 1276	963, 362
18	492, 1045, 920, 161	286
19	286, 509	1146, 716, 1140
20	509, 1276, 286	26, 407

Weighting Scheme 2

Query Number	Relevant Documents (Doc ID)	Non-Relevant Documents (Doc ID)
1	238, 429	430, 141, 502
2	429, 320, 12, 238	578
3	5, 485, 181	320, 509
4	320, 1085, 1011	1221, 1189
5	320, 533, 650	5, 1032
6	137, 1146	271, 418, 286
7	492, 312, 973, 708	430
8	492, 1306, 1083	248, 291
9	398, 507, 21	326, 181
10	405, 436, 438, 524	302
11	320, 495, 264	670, 570
12	650, 339, 203	506, 925
13	879, 880, 496	38, 440
14	291, 609	1317, 1276, 1314
15	509, 1099, 405, 817	1096
16	106, 339	498, 93, 326
17	320, 298, 963	577, 4
18	492, 1006	312, 291, 920
19	286, 509, 1146	716, 1331
20	509, 1276, 953, 500	26

Solution 4:

Top-ranked non-relevant document did not get a lower score because of the following reasons:-

• The queries are so big that it contains so many terms and it is really hard to make the context and while calculating the cosine similarities the relevant information is missed.

• The weighting scheme is not perfect: Term frequency (tf) has a lot of weightage in calculating the weights . If the term frequency is higher, the document will have higher weight inspite of not making any sense.

• Cranfield has Small collection size. So, it is possible that less documents are present corresponding to the query. As we are printing the top 5 documents, hardly a few are relevant to the query and the rest are not.

Solution 5:

W1 weighting scheme gives a lot of importance to maxtf. So, it is possible that if the document which has some not relevant term occuring too many times it will correspond to the higher weights and will yield higher cosine similarity.

W2 weighting scheme gives a lot of importance to doclen. it is possible that if the document which is not relevant pertaining to the query has too many terms it will lead to higher doclen, it will correspond to the higher weights and will yield higher cosine similarity.

The impact of maxtf is more important that doclen. As the variation in the maxtf is not much as compared doclen. Because the documents can have varied length. So, the W1 weighting scheme is more realistic than W2 weighting scheme because the documents can be of any size too large and too small. We can also see that we have more non-relevant documents in the W2 weighting scheme as compared to W1 weighting scheme

Solution 6:

The design decisions you made in building your ranking system:

- Cranfield collection documents are parsed, tokenization is done and lemmatization is done using NLTK WordNet Lemmatizer (completed till assignment 2)
- Queries are parsed, tokenization is done and lemmatization is done
- Generated dictionary for the documents which contains the additional information like "total_terms", most_common, "num_most_common", "document_length"
- Then we have generated the ordered postings with indexing for the documents
- The we have calculated the weights using two schemes for the documents and the queries:

The weighting functions are provided by W1 and W2:

W1 = [0.4 + 0.6 * log (tf + 0.5) / log (maxtf + 1.0)]
* [log (collectionsize / df)/ log (collectionsize)]
W2 = [0.4 + 0.6 * (tf / (tf + 0.5 + 1.5 *(doclen / avgdoclen)))] *
[log (collectionsize / df)/log (collectionsize)]
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,
discounting stop-words, - you may use the same stopword list as in the previous homework;
avgdoclen: the average document length in the
collection, considering the doclen of each document, and
collectionsize: the number of documents in the collection.

• Then the cosine similarity is calculated for each query
• For extracting the top-5 documents for every query, we calculated the cosine similarities for each query with respect to every documents common in terms as their scores.
• The top 5 documents with their score and their vector representations are shown on the output console.
• The titles are also displayed for the top 5 documents

Console Output on Anaconda Prompt:

The following Results are as follows:

A Statistical Relevance model in retrieval system based on the vector relevance model:

Query No: 1

Query Vector for weight (Version 1) are:

[('aeroelastic', 0.05247433347812679),

('aircraft', 0.05247433347812679),

('constructing', 0.06827068185751761),

('heated', 0.06827068185751761),

('high', 0.05247433347812679),

('law', 0.06827068185751761),

('model', 0.06827068185751761),

('must', 0.06827068185751761),

('similarity', 0.06827068185751761),

('speed', 0.05247433347812679)]

Query Vector for weight (Version 2) are:

[('aeroelastic', 0.05052658164092087),

('aircraft', 0.05052658164092087),

('constructing', 0.05479005299633102),

('heated', 0.05479005299633102),

('high', 0.05052658164092087),

('law', 0.05479005299633102),

('model', 0.05479005299633102),

('must', 0.05479005299633102),

('similarity', 0.05479005299633102),

('speed', 0.05052658164092087)]

Ranks Document Number Scores Titles

1 238 0.052908002524909785 on a determination of the pitot-static tube factor at low reynolds numbers, with special reference to the measurement of low air speeds .

Vector Representation for the Rank 1 With Document ID 238

{'anemometer': 0.5354108567977349, 'calibration': 0.5354108567977349, 'enquiry': 0.7509775004326937, 'instrument': 0.5652336036984639, 'low': 0.24479870151537933, 'provide': 0.35407892984037437, 'reason': 0.5232008027208732, 'speed': 0.185448131504831, 'standard': 0.44042298928386026, 'to': 0.011748290985597008}

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2 429 0.04822475792519278 a description of the r. a. e. high speed supersonic tunnel .

Vector Representation for the Rank 2 With Document ID 429

{'account': 0.303402320792395, 'completion': 0.6370891515767835, 'described': 0.2685217101712429, 'design': 0.25730367938315063, 'development': 0.303402320792395, 'feature': 0.351849475256591, 'given': 0.13356179239887297, 'high': 0.19815778000687356, 'interesting': 0.4305425982496091, 'more': 0.22616033318930492, 'nearing': 0.7509775004326937, 'noted': 0.46355530891941527, 'now': 0.42593447771869397, 'philosophy': 0.6370891515767835, 'principal': 0.43536512556343715, 'problem': 0.15629204698258145, 'reviewed': 0.4305425982496091, 'speed': 0.185448131504831, 'supersonic': 0.19326698423974895, 'tunnel': 0.2167582158642367}

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3 430 0.030811769765415446 calibration of the flow in the mach 4 working section of the 4ft . x 3ft . high supersonic speed wind tunnel at rae bedford .

Vector Representation for the Rank 3 With Document ID 430

{'angle': 0.163564324255595, 'distribution': 0.12607535993592625, 'flow': 0.06220061601834868, 'ft': 0.46965022359082137, 'high': 0.1639777441416276, 'humidity': 0.5271982855734489, 'mach': 0.16307374923830095, 'nozzle': 0.24553235789630273, 'number': 0.07845045600431105, 'presented': 0.12397011415191703, 'pressure': 0.0834887895608359, 'range': 0.13837168420922066, 'section': 0.20322597653563415, 'speed': 0.1534603701070292, 'supersonic': 0.15993055680978174, 'total': 0.23833663006222613, 'tunnel': 0.17936980955453063, 'wind': 0.21074975241888858, 'working': 0.37839647016748407, 'x': 0.23448049951385272}

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4 879 0.02950570717667317 flutter model testing at transonic speeds .

Vector Representation for the Rank 4 With Document ID 879

{'construction': 0.3950520390840711, 'delta': 0.32685940877657377, 'developed': 0.17887537325596373, 'facility': 0.3950520390840711, 'flutter': 0.27924930419983346, 'foot': 0.32685940877657377, 'model': 0.26133963885470796, 'on': 0.047578484797422, 'plane':

0.23079027635009564, 'reflection': 0.36885503908586875, 'research': 0.2875844439235415, 'straight': 0.3387105610060959, 'swept': 0.3387105610060959, 'technique': 0.2393283689727511, 'test': 0.15875271962933116, 'testing': 0.33559078227780864, 'transonic': 0.2824868378681199, 'wing': 0.15953614480318243, 'x': 0.23448049951385272}

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5 509 0.027613238082377662 a graphical approximation for temperatures and sublimation rates at surfaces subjected to small net and large gross heat transfer rates .

Vector Representation for the Rank 5 With Document ID 509

{'acted': 0.5271982855734489, 'at': 0.055861380633815266, 'by': 0.06275576151877217, 'change': 0.22302558106185744, 'condition': 0.1242304617275272, 'conduction': 0.3093937822796063, 'considers': 0.36885503908586875, 'derived': 0.19103750478445003, 'entry': 0.3164485331545604, 'heat': 0.14608784514803438, 'heated': 0.3524654687089807, 'heating': 0.2545706528709851, 'material': 0.26203487688769017, 'method': 0.09736364101196376, 'most': 0.23261554649289723, 're': 0.32685940877657377, 'severe': 0.3891335228376759, 'space': 0.36885503908586875, 'state': 0.2731192355396403, 'sublimation': 0.5271982855734489, 'such': 0.17789496875257943, 'suitable': 0.3049936147025652, 'surface': 0.12634218584411033, 'under': 0.18036731451851562, 'upon': 0.2545706528709851, 'vehicle': 0.2716527987994464}

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Rankings Doc No Score Titles

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1 238 0.020301920239958363 on a determination of the pitot-static tube factor at low reynolds numbers, with special reference to the measurement of low air speeds .

Vector Representation for the Rank 1 With Document ID 238

{'anemometer': 0.6587427378194435, 'calibration': 0.6587427378194435, 'enquiry': 0.7629175091161123, 'instrument': 0.6731548833417484, 'low': 0.5183014603468571, 'provide': 0.5711122412777057, 'reason': 0.6528421050984972, 'speed': 0.4896196942214549, 'standard': 0.6128388855009328, 'to': 0.40567748101428813}

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2 429 0.018621973225484735 a description of the r. a. e. high speed supersonic tunnel .

Vector Representation for the Rank 2 With Document ID 429

{'account': 0.5319438365869127, 'completion': 0.6770578243679968, 'described': 0.5167749295863688, 'design': 0.5118964236564693, 'development': 0.5319438365869127, 'feature': 0.5530125726962148, 'given': 0.45808345586977395, 'high': 0.4861750090617886, 'interesting': 0.5872346990582913, 'more': 0.4983527811087177, 'nearing': 0.7265856778509625, 'noted': 0.6015912922792392, 'now': 0.5852307160277201, 'philosophy': 0.6770578243679968, 'principal': 0.5893319234769109, 'problem': 0.46796840661286304, 'reviewed': 0.5872346990582913, 'speed': 0.4806478272635384, 'supersonic': 0.48404809600525, 'tunnel': 0.4942639810340518}

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3 430 0.018074106688195875 calibration of the flow in the mach 4 working section of the 4ft . x 3ft . high supersonic speed wind tunnel at rae bedford .

Vector Representation for the Rank 3 With Document ID 430

{'angle': 0.48548231880139464, 'distribution': 0.4658897602523783, 'flow': 0.43250741206752935, 'ft': 0.6198152993936824, 'high': 0.4856983811405233, 'humidity': 0.675525437004926, 'mach': 0.4763251100744669, 'nozzle': 0.5283206187490602, 'number': 0.44099993639074936, 'presented': 0.4647895124319383, 'pressure': 0.44363308049027567, 'range': 0.47231609017731074, 'section': 0.5062103719378132, 'speed': 0.4802017697965108, 'supersonic': 0.4835832318906833, 'total': 0.5245599728776573, 'tunnel': 0.49374261357706395, 'wind': 0.5101424629458595, 'working': 0.5977583305124242, 'x': 0.522544674111401}

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4 141 0.017455983842637336 free-flight techniques for high speed aerodynamic research .

Vector Representation for the Rank 4 With Document ID 141

{'aeroelastic': 0.5653168763789699, 'airborne': 0.6600540297733153, 'airplane': 0.5379574938416957, 'also': 0.4543543141920649, 'bang': 0.6600540297733153, 'beyond': 0.5430945427503009, 'borne': 0.6351713604835433, 'both': 0.47057972298462447, 'calibration': 0.5854060219039989, 'component': 0.5136781682262681, 'control': 0.5250340784033166, 'described': 0.49298567902689444, 'detail': 0.5070319059829517, 'development': 0.505064394231755, 'discussed': 0.46896806613993514, 'drag': 0.4834360448448163, 'effected': 0.6022782608736025, 'estimation': 0.5773955915838305, 'evaluation': 0.5474957336089541, 'extension': 0.522613064319182, 'free': 0.47131991629254794, 'high': 0.4686195381246846, 'higher': 0.4933292041707567, 'interference': 0.5242087982966382, 'involved': 0.526743835039648, 'launched': 0.6206159320311806, 'lift': 0.48587534474491056, 'limit': 0.5182118734605288, 'longitudinal': 0.5242087982966382, 'mach': 0.4470976775223156, 'measurement': 0.5292369278508107, 'model': 0.4754780588051052, 'much': 0.5096533698442756, 'number': 0.44580510323934325, 'obtained': 0.44443734186121253, 'on': 0.41991010224321423, 'pressure': 0.4349374374445928, 'recording': 0.6206159320311806, 'reynolds': 0.47131991629254794, 'rocket': 0.5892541798010607, 'sonic': 0.5168570672571391, 'speed': 0.4642183472660315, 'stability': 0.49734230364321486, 'telemetering': 0.6600540297733153, 'test': 0.4926914269529348, 'than': 0.4596171008950292, 'tracking': 0.6600540297733153, 'tunnel': 0.5206215244816765, 'unit': 0.5525129222940584, 'usual': 0.5314124957095017, 'wall': 0.47632775773021274, 'wind': 0.48819215526215143}

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5 502 0.016170991444720964 on squire's test of the compressibility transformation .

Vector Representation for the Rank 5 With Document ID 502

{'air': 0.4904638414295134, 'application': 0.5052716488100103, 'author': 0.5218638904103183, 'boundary': 0.4491059460884536, 'by': 0.42214575039211555, 'compressibility': 0.6332039257851444, 'correlation': 0.5436028304942103, 'data': 0.48218022169316194, 'discussion': 0.5346507085149965, 'helium': 0.5581961193607206, 'high': 0.4838434521650712, 'incorrect': 0.656943289080779, 'invalid': 0.6695617290588387, 'layer': 0.4553900830476405, 'previous': 0.5452900557414009, 'shown': 0.4698175401547281, 'speed': 0.4784658141728666, 'squire': 0.7757187396607779, 'suggestion':

0.621373904542798, 'that': 0.4241639914229409, 'to': 0.4064996471777625, 'transformation': 0.6053589940621771}

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Query No: 2

Query Vector for weight (Version 1) are:

[('aeroelastic', 0.07215220853242434),

('aircraft', 0.07215220853242434),

('associated', 0.09387218755408672),

('flight', 0.09387218755408672),

('high', 0.07215220853242434),

('problem', 0.04343995804332474),

('speed', 0.07215220853242434),

('structural', 0.09387218755408672)]

Query Vector for weight (Version 2) are:

[('aeroelastic', 0.07250110412252518),

('aircraft', 0.07250110412252518),

('associated', 0.07927461139896373),

('flight', 0.07927461139896373),

('high', 0.07250110412252518),

('problem', 0.06354701455287709),

('speed', 0.07250110412252518),

('structural', 0.07927461139896373)]

Ranks Document Number Scores Titles

1 429 0.06105668858242899 a description of the r. a. e. high speed supersonic tunnel .

Vector Representation for the Rank 1 With Document ID 429

{'account': 0.303402320792395, 'completion': 0.6370891515767835, 'described': 0.2685217101712429, 'design': 0.25730367938315063, 'development': 0.303402320792395, 'feature': 0.351849475256591, 'given': 0.13356179239887297, 'high': 0.19815778000687356, 'interesting': 0.4305425982496091, 'more': 0.22616033318930492, 'nearing': 0.7509775004326937, 'noted': 0.46355530891941527, 'now': 0.42593447771869397, 'philosophy': 0.6370891515767835, 'principal': 0.43536512556343715, 'problem': 0.15629204698258145, 'reviewed': 0.4305425982496091, 'speed': 0.185448131504831, 'supersonic': 0.19326698423974895, 'tunnel': 0.2167582158642367}

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2 238 0.052908002524909785 on a determination of the pitot-static tube factor at low reynolds numbers, with special reference to the measurement of low air speeds .

Vector Representation for the Rank 2 With Document ID 238

{'anemometer': 0.5354108567977349, 'calibration': 0.5354108567977349, 'enquiry': 0.7509775004326937, 'instrument': 0.5652336036984639, 'low': 0.24479870151537933, 'provide': 0.35407892984037437, 'reason': 0.5232008027208732, 'speed': 0.185448131504831, 'standard': 0.44042298928386026, 'to': 0.011748290985597008}

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3 1158 0.033165630102438365 the tailored-interface hypersonic shock tunnel .

Vector Representation for the Rank 3 With Document ID 1158

{'application': 0.2983146820692516, 'associated': 0.26203487688769017, 'compared': 0.16998511017361387, 'condition': 0.1242304617275272, 'cylinder': 0.1834313709581794, 'discussed': 0.1648106095218505, 'encountered': 0.34194809467438225, 'evidence': 0.33559078227780864, 'experiment': 0.20257362008142774, 'experimental': 0.13329773304442719, 'flight': 0.2144007059732076, 'flow': 0.06220061601834868, 'gasdynamic': 0.4677370287671866, 'heattransfer': 0.4157399959776291, 'hemisphere': 0.3562787391713667, 'high': 0.23759229630146478, 'hypersonic': 0.2818397039595156, 'indication': 0.42391612831509007, 'interface': 0.44305837743833826, 'mach': 0.11254769596942187, 'mean': 0.19691545141064268, 'model': 0.18036731451851562, 'number': 0.07845045600431105, 'on': 0.047578484797422, 'phenomenon': 0.2731192355396403, 'presented': 0.17962403525120432, 'producing': 0.3950520390840711, 'provides': 0.3387105610060959, 'research': 0.2875844439235415, 'result': 0.066747412341137, 'shock': 0.22182330964418126, 'stagnation': 0.20793689516404892, 'successful': 0.4329544232897724, 'tailored': 0.5619808910508631, 'technique': 0.2393283689727511, 'temperature': 0.14343792139007638, 'theory': 0.10126360623697798, 'tunnel': 0.25989432384439404, 'various': 0.19047126866708147}

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4 12 0.03239199196622085 some structural and aerelastic considerations of high speed flight .

Vector Representation for the Rank 4 With Document ID 12

{'acrothermoelasticity': 0.5754887502163468, 'aeroelastic': 0.5063865293673488, 'aeronautical': 0.38499752796799536, 'aircraft': 0.3409975204723399, 'alleviating': 0.5754887502163468, 'analytical': 0.24510287777053558, 'another': 0.32302094422766553, 'art': 0.4882138804505711, 'attacking': 0.5754887502163468, 'available': 0.2273761286881724, 'avenue': 0.5204244381420449, 'boundary': 0.08893771596118338, 'combined': 0.27669521436564537, 'concerned': 0.2953511086593236, 'demand': 0.4882138804505711, 'design': 0.19717684323293277, 'discussed': 0.1526234614487881, 'discussion': 0.24387120953351712, 'dominating': 0.5754887502163468, 'engineer': 0.4882138804505711, 'experimental': 0.12344084813192648, 'factor': 0.3189316829643157, 'failure': 0.3001671898448374, 'finally': 0.28445171299870836, 'flight': 0.2748236147404805, 'from': 0.0654778691891005, 'fundamental': 0.3166622706901821, 'heat': 0.13528517773688292, 'high': 0.24861669438432416, 'input': 0.4009390106847955, 'interrelation': 0.5204244381420449, 'into': 0.16843587669615823, 'largely': 0.35523150191913927, 'layer': 0.10031916428784036, 'load': 0.19924036210699853, 'matter': 0.4882138804505711, 'meet':

0.4653601260677431, 'method': 0.09016395214855977, 'mode': 0.2515650575245636, 'one': 0.13374258538491338, 'origin': 0.42090368268483946, 'presented': 0.11480297289695095, 'problem': 0.11976965319858021, 'research': 0.26631861515333216, 'respect': 0.2615979586158803, 'speed': 0.23267065987962346, 'state': 0.2529230565753127, 'structural': 0.41548459161682993, 'structure': 0.3120136511843358, 'subject': 0.2930483094538725, 'suggested': 0.2730836374538286, 'summarized': 0.3780852563019674, 'summary': 0.3603585072196042, 'thermal': 0.3133628759364394, 'these': 0.10276369593045806, 'to': 0.014739876826450955, 'tool': 0.39256906491107807, 'transfer': 0.16207720315867485, 'under': 0.16702980441552476, 'upon': 0.23574607446188983, 'well': 0.17083608978255838}

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5 430 0.030811769765415446 calibration of the flow in the mach 4 working section of the 4ft . x 3ft . high supersonic speed wind tunnel at rae bedford .

Vector Representation for the Rank 5 With Document ID 430

{'angle': 0.163564324255595, 'distribution': 0.12607535993592625, 'flow': 0.06220061601834868, 'ft': 0.46965022359082137, 'high': 0.1639777441416276, 'humidity': 0.5271982855734489, 'mach': 0.16307374923830095, 'nozzle': 0.24553235789630273, 'number': 0.07845045600431105, 'presented': 0.12397011415191703, 'pressure': 0.0834887895608359, 'range': 0.13837168420922066, 'section': 0.20322597653563415, 'speed': 0.1534603701070292, 'supersonic': 0.15993055680978174, 'total': 0.23833663006222613, 'tunnel': 0.17936980955453063, 'wind': 0.21074975241888858, 'working': 0.37839647016748407, 'x': 0.23448049951385272}

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Rankings Doc No Score Titles

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1 429 0.027516213737445568 a description of the r. a. e. high speed supersonic tunnel .

Vector Representation for the Rank 1 With Document ID 429

{'account': 0.5319438365869127, 'completion': 0.6770578243679968, 'described': 0.5167749295863688, 'design': 0.5118964236564693, 'development': 0.5319438365869127, 'feature': 0.5530125726962148, 'given': 0.45808345586977395, 'high': 0.4861750090617886, 'interesting': 0.5872346990582913, 'more': 0.4983527811087177, 'nearing': 0.7265856778509625, 'noted': 0.6015912922792392, 'now': 0.5852307160277201, 'philosophy': 0.6770578243679968, 'principal': 0.5893319234769109, 'problem': 0.46796840661286304, 'reviewed': 0.5872346990582913, 'speed': 0.4806478272635384, 'supersonic': 0.48404809600525, 'tunnel': 0.4942639810340518}

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2 320 0.024250961143392143 comment on improved numerical solution of the blasius problem with three-point boundary conditions .

Vector Representation for the Rank 2 With Document ID 320

{'accurate': 0.5618011772797783, 'attention': 0.5880409419101723, 'drawn': 0.6330114612824701, 'previous': 0.5701493459299061, 'problem': 0.47744427105224063, 'solution': 0.4649972675032589, 'to': 0.4071860442032682}

==========

3 12 0.02196194528197233 some structural and aerelastic considerations of high speed flight .

Vector Representation for the Rank 3 With Document ID 12

{'acrothermoelasticity': 0.6234408380037073, 'aeroelastic': 0.6069974515404812, 'aeronautical': 0.5494801944367897, 'aircraft': 0.5393907887075574, 'alleviating': 0.6234408380037073, 'analytical': 0.49516431448152587, 'another': 0.5254169963250277, 'art': 0.5895552580861185, 'attacking': 0.6234408380037073, 'available': 0.4882816783421476, 'avenue': 0.6020614174166771, 'boundary': 0.434531201134743, 'combined': 0.5074304415963526, 'concerned': 0.5146738301997285, 'demand': 0.5895552580861185, 'design': 0.4765564210774396, 'discussed': 0.45925800306665154, 'discussion': 0.4946861035991785, 'dominating': 0.6234408380037073, 'engineer': 0.5895552580861185,

'experimental': 0.44792748171031505, 'factor': 0.5303708565699987, 'failure': 0.5165437350685561, 'finally': 0.5104420009950285, 'flight': 0.5123406421286423, 'from': 0.4254226167875734, 'fundamental': 0.522948160325587, 'heat': 0.4525261935557311, 'high': 0.5013728510465819, 'input': 0.5556696781685296, 'interrelation': 0.6020614174166771, 'into': 0.46539737470928877, 'largely': 0.5379231556555863, 'layer': 0.4389501934275516, 'load': 0.47735760856596027, 'matter': 0.5895552580861185, 'meet': 0.5806819968296468, 'method': 0.43500730295462187, 'mode': 0.4976733380880304, 'one': 0.451927262425118, 'origin': 0.5634212163879683, 'presented': 0.4445737166187319, 'problem': 0.4465020935127639, 'research': 0.5034015947722292, 'respect': 0.5015687397385568, 'speed': 0.49487089435122894, 'state': 0.498200598518045, 'structural': 0.5698391379535123, 'structure': 0.5275429477195778, 'subject': 0.5137797390745296, 'suggested': 0.5060282008550909, 'summarized': 0.546796416912058, 'summary': 0.5399137807726797, 'thermal': 0.5280944751971939, 'these': 0.4398993139769068, 'to': 0.4060101488424705, 'tool': 0.5524199401032384, 'transfer': 0.462928538709848, 'under': 0.4648514492354017, 'upon': 0.4915314164074389, 'well': 0.4663292880146507}

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4 238 0.021186495365798995 on a determination of the pitot-static tube factor at low reynolds numbers, with special reference to the measurement of low air speeds .

Vector Representation for the Rank 4 With Document ID 238

{'anemometer': 0.6587427378194435, 'calibration': 0.6587427378194435, 'enquiry': 0.7629175091161123, 'instrument': 0.6731548833417484, 'low': 0.5183014603468571, 'provide': 0.5711122412777057, 'reason': 0.6528421050984972, 'speed': 0.4896196942214549, 'standard': 0.6128388855009328, 'to': 0.40567748101428813}

==========

5 578 0.018915237032254 86 dissociation scaling for nonequilibrium blunt nose flows .

Vector Representation for the Rank 5 With Document ID 578

{'air': 0.4858199411207257, 'analysis': 0.4695763134953603, 'at': 0.42709624410055674, 'blade': 0.5572260547146666, 'characteristic': 0.4879789105721722, 'compressor': 0.6353350038875814,

'considered': 0.4775762674908278, 'efficiency': 0.5916248105934715, 'high': 0.47953940507568715, 'intermediate': 0.6300555295662313, 'lowspeed': 0.6725956865187944, 'more': 0.4907794705460089, 'multiple': 0.6016597564463906, 'one': 0.4700536892732316, 'operating': 0.5642956893711643, 'operation': 0.5674980997784189, 'part': 0.5102314863806159, 'performance': 0.5469133939337625, 'poor': 0.6934873330475382, 'pressure': 0.4404972558130974, 'principal': 0.574753083511616, 'problem': 0.483512873712725, 'ratio': 0.46536658080132304, 'row': 0.6016597564463906, 'speed': 0.511389755104936, 'stacking': 0.6437532785677624, 'stage': 0.5658660945699673, 'stall': 0.5947085025209993, 'stalled': 0.6557239594369391, 'study': 0.4910436669822318, 'surge': 0.6437532785677624, 'valued': 0.6557239594369391, 'were': 0.4649397996352611}

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Query No: 3

Query Vector for weight (Version 1) are:

[('composite', 0.09387218755408672),

('conduction', 0.09387218755408672),

('far', 0.09387218755408672),

('heat', 0.07215220853242434),

('problem', 0.04343995804332474),

('slab', 0.09387218755408672),

('so', 0.09387218755408672),

('solved', 0.09387218755408672)]

Query Vector for weight (Version 2) are:

[('composite', 0.07927461139896373),

('conduction', 0.07927461139896373),

('far', 0.07927461139896373),

('heat', 0.07250110412252518),

('problem', 0.06354701455287709),

('slab', 0.07927461139896373),

('so', 0.07927461139896373),

('solved', 0.07927461139896373)]

Ranks Document Number Scores Titles

1 5 0.1025143597741058 one-dimensional transient heat conduction into a double-layer slab subjected to a linear heat input for a small time internal .

Vector Representation for the Rank 1 With Document ID 5

{'aerodynamic': 0.19814096454326377, 'analytic': 0.3488145151546617, 'at': 0.055861380633815266, 'composite': 0.44305837743833826, 'conduction': 0.3093937822796063, 'during': 0.2875844439235415, 'example': 0.2058861729589721, 'exposed': 0.42391612831509007, 'heat': 0.2116710823907653, 'heating': 0.36885509251999693, 'may': 0.15419672192711542, 'occur': 0.26739815197031136, 'one': 0.14442207513234676, 'presented': 0.12397011415191703, 'rate': 0.28269988518058486, 'slab': 0.4014093514806447, 'solution': 0.10854665920362061, 'surface': 0.12634218584411033, 'to': 0.009721840107770649, 'transient': 0.3296722660314134, 'triangular': 0.36885503908586875, 'type': 0.17789496875257943}

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2 485 0.09143172628501331 linear heat flow in a composite slab .

Vector Representation for the Rank 2 With Document ID 485

{'case': 0.11555798590132785, 'composite': 0.44305837743833826, 'conduction': 0.3093937822796063, 'considered': 0.15993055680978174, 'determined': 0.19938423935311986, 'external': 0.25947395655495925, 'function': 0.2535906563998364, 'heat': 0.14608784514803438, 'linear': 0.2335429550964559, 'position': 0.26334458874487165, 'prescribed': 0.3488145151546617, 'slab':

0.4014093514806447, 'surface': 0.12634218584411033, 'temperature': 0.20783152798066645, 'throughout': 0.33559078227780864, 'time': 0.19103750478445003, 'to': 0.009721840107770649, 'ture': 0.5271982855734489, 'two': 0.1051403770694433}

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3 181 0.06871425278141961 some problems on heat conduction in stratiform bodies .

Vector Representation for the Rank 3 With Document ID 181

{'applied': 0.19160750329564033, 'arising': 0.3453126223855793, 'body': 0.13961047050608286, 'calculation': 0.17361674072744135, 'case': 0.11555798590132785, 'class': 0.3387105610060959, 'complicated': 0.4082757719609241, 'composite': 0.44305837743833826, 'conduction': 0.3093937822796063, 'deduction': 0.5619808910508631, 'difficulty': 0.360269433606657, 'general': 0.1639777441416276, 'give': 0.20322597653563415, 'heat': 0.14608784514803438, 'idea': 0.37839647016748407, 'infinite': 0.26074486069362346, 'lead': 0.26203487688769017, 'multilayer': 0.6214421478571256, 'on': 0.047578484797422, 'paper': 0.16692885196679205, 'present': 0.1603267905873086, 'problem': 0.12933338923453824, 'question': 0.3835971206320758, 'solides': 0.6214421478571256, 'special': 0.25947395655495925, 'specific': 0.2761295254715463, 'to': 0.014086267179562515, 'usually': 0.3387105610060959}

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4 509 0.040258151555959104 a graphical approximation for temperatures and sublimation rates at surfaces subjected to small net and large gross heat transfer rates .

Vector Representation for the Rank 4 With Document ID 509

{'acted': 0.5271982855734489, 'at': 0.055861380633815266, 'by': 0.06275576151877217, 'change': 0.22302558106185744, 'condition': 0.1242304617275272, 'conduction': 0.3093937822796063, 'considers': 0.36885503908586875, 'derived': 0.19103750478445003, 'entry': 0.3164485331545604, 'heat': 0.14608784514803438, 'heated': 0.3524654687089807, 'heating': 0.2545706528709851, 'material': 0.26203487688769017, 'method': 0.09736364101196376, 'most': 0.23261554649289723, 're': 0.32685940877657377, 'severe': 0.3891335228376759, 'space': 0.36885503908586875, 'state': 0.2731192355396403, 'sublimation': 0.5271982855734489, 'such': 0.17789496875257943, 'suitable':

0.3049936147025652, 'surface': 0.12634218584411033, 'under': 0.18036731451851562, 'upon': 0.2545706528709851, 'vehicle': 0.2716527987994464}

==========

5 281 0.030573866246648866 higher order approximations for relaxation oscillations .

Vector Representation for the Rank 5 With Document ID 281

{'asymptotic': 0.31403190967724753, 'by': 0.04331179236839078, 'can': 0.13535079247784257, 'carry': 0.4545132958903335, 'case': 0.11555798590132785, 'development': 0.36378109452860397, 'enough': 0.37349316648351, 'explicitly': 0.42391612831509007, 'ha': 0.11966097837637452, 'haag': 0.6214421478571256, 'indicates': 0.3028753722576236, 'involved': 0.3028753722576236, 'one': 0.14442207513234676, 'oscillation': 0.31893521336122166, 'out': 0.20793689516404892, 'paper': 0.16692885196679205, 'problem': 0.12933338923453824, 'quantity': 0.31168150346321444, 'relaxation': 0.3488145151546617, 'simple': 0.17549188555788003, 'solved': 0.2875844439235415, 'solving': 0.3524654687089807, 'such': 0.17789496875257943, 'to': 0.009721840107770649, 'treated': 0.2660255713229804}

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Rankings Doc No Score Titles

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1 5 0.053021870683326956 one-dimensional transient heat conduction into a double-layer slab subjected to a linear heat input for a small time internal .

Vector Representation for the Rank 1 With Document ID 5

{'aerodynamic': 0.5041287615243675, 'analytic': 0.5833120351892043, 'at': 0.42935675818399677, 'composite': 0.63283988867217, 'conduction': 0.5625953090840068, 'during': 0.5511338760687907,

'example': 0.5081990907565628, 'exposed': 0.6227800875674897, 'heat': 0.49942742140135155, 'heating': 0.5732608455807672, 'may': 0.4810348012708999, 'occur': 0.5405254005034051, 'one': 0.47589794394599705, 'presented': 0.4651498516847835, 'rate': 0.5327915003622148, 'slab': 0.6109521306224008, 'solution': 0.45704438361110655, 'surface': 0.4663964434136795, 'to': 0.4051091058958636, 'transient': 0.5732522340845239, 'triangular': 0.5938439054769377, 'type': 0.4934889098794988}

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2 485 0.04725029567217094 linear heat flow in a composite slab .

Vector Representation for the Rank 2 With Document ID 485

{'case': 0.459407414204706, 'composite': 0.6277726834718212, 'conduction': 0.5590568097296165, 'considered': 0.4822189895253167, 'determined': 0.5025018046200209, 'external': 0.533393436136526, 'function': 0.5174265330937424, 'heat': 0.4751025648231076, 'linear': 0.5200625206452891, 'position': 0.5353832964473187, 'prescribed': 0.5793226856696936, 'slab': 0.6063612603062777, 'surface': 0.4649514830794811, 'temperature': 0.4962375197289033, 'throughout': 0.5725244728917519, 'time': 0.49821081673277, 'to': 0.40499791838365384, 'ture': 0.6710283211911958, 'two': 0.45405180681789314}

==========

3 181 0.039125421162851115 some problems on heat conduction in stratiform bodies .

Vector Representation for the Rank 3 With Document ID 181

{'applied': 0.49744353515700135, 'arising': 0.5756115083221334, 'body': 0.47100002639277916, 'calculation': 0.488294188316911, 'case': 0.45876794211171434, 'class': 0.5722539769672794, 'complicated': 0.6076319238784809, 'composite': 0.6253208973340816, 'conduction': 0.5573446936177807, 'deduction': 0.6857998970436128, 'difficulty': 0.5832179148301757, 'general': 0.4833921991644365, 'give': 0.5033522030648816, 'heat': 0.4742941473055401, 'idea': 0.592436564904029, 'infinite': 0.5326038937045354, 'lead': 0.5332599418038924, 'multilayer': 0.7160393968983785, 'on': 0.42419642068463786, 'paper': 0.4848930087578365, 'present': 0.48153547740298264, 'problem': 0.465773534147066, 'question': 0.595081397479316, 'solides':

0.7160393968983785, 'special': 0.5319575651944978, 'specific': 0.5404278885762452, 'to': 0.4064767343953059, 'usually': 0.5722539769672794}

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4 320 0.024250961143392143 comment on improved numerical solution of the blasius problem with three-point boundary conditions .

Vector Representation for the Rank 4 With Document ID 320

{'accurate': 0.5618011772797783, 'attention': 0.5880409419101723, 'drawn': 0.6330114612824701, 'previous': 0.5701493459299061, 'problem': 0.47744427105224063, 'solution': 0.4649972675032589, 'to': 0.4071860442032682}

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5 509 0.02092280184673496 a graphical approximation for temperatures and sublimation rates at surfaces subjected to small net and large gross heat transfer rates .

Vector Representation for the Rank 5 With Document ID 509

{'acted': 0.6725109590639371, 'at': 0.42887497707735966, 'by': 0.4291629329558567, 'change': 0.5152828388370986, 'condition': 0.4642152358926964, 'conduction': 0.5599269167685637, 'considers': 0.5906626846244781, 'derived': 0.4987480708313855, 'entry': 0.5635735464703271, 'heat': 0.4755134071530064, 'heated': 0.5821908483832174, 'heating': 0.5315886160136986, 'material': 0.5354469040641762, 'method': 0.45032766592036005, 'most': 0.5202399313552581, 're': 0.5689549708377533, 'severe': 0.6011447161613533, 'space': 0.5906626846244781, 'state': 0.5411764545758323, 'sublimation': 0.6725109590639371, 'such': 0.4919546399789279, 'suitable': 0.557652452076105, 'surface': 0.46530679476160014, 'under': 0.4932326056594879, 'upon': 0.5315886160136986, 'vehicle': 0.5404184474020378}

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Query No: 4

Query Vector for weight (Version 1) are:

[('assumption', 0.035760833353937795),

('based', 0.035760833353937795),

('can', 0.019212277908861708),

('chemical', 0.027486555631399748),

('chemically', 0.035760833353937795),

('criterion', 0.035760833353937795),

('developed', 0.035760833353937795),

('empirically', 0.035760833353937795),

('equilibrium', 0.035760833353937795),

('flow', 0.012531999063099031),

('gas', 0.027486555631399748),

('instantaneous', 0.035760833353937795),

('local', 0.035760833353937795),

('mixture', 0.035760833353937795),

('on', 0.019212277908861708),

('reacting', 0.035760833353937795),

('show', 0.035760833353937795),

('simplifying', 0.035760833353937795),

('solution', 0.027486555631399748),

('to', 0.014372135720624499),

('validity', 0.035760833353937795)]

Query Vector for weight (Version 2) are:

[('assumption', 0.02571133716644553),

('based', 0.02571133716644553),

('can', 0.022627658783776764),

('chemical', 0.024169497975111143),

('chemically', 0.02571133716644553),

('criterion', 0.02571133716644553),

('developed', 0.02571133716644553),

('empirically', 0.02571133716644553),

('equilibrium', 0.02571133716644553),

('flow', 0.021382847323631632),

('gas', 0.024169497975111143),

('instantaneous', 0.02571133716644553),

('local', 0.02571133716644553),

('mixture', 0.02571133716644553),

('on', 0.022627658783776764),

('reacting', 0.02571133716644553),

('show', 0.02571133716644553),

('simplifying', 0.02571133716644553),

('solution', 0.024169497975111143),

('to', 0.021725740674703915),

('validity', 0.02571133716644553)]

Ranks Document Number Scores Titles

1 1085 0.04955435239159394 note on the convergence of numerical solutions of the navier-stokes equations .

Vector Representation for the Rank 1 With Document ID 1085

{'applies': 0.3299332158936935, 'based': 0.1578280080047599, 'case': 0.10701289108437298, 'certain': 0.19717684323293277, 'condition': 0.11504406871162397, 'converge': 0.42090368268483946, 'convergence': 0.3336288129190638, 'criterion': 0.41548459161682993, 'dimension': 0.4618014086047822, 'equation': 0.10052002661977971, 'exceeds': 0.39256906491107807, 'fixed': 0.28445171299870836, 'flow': 0.05760110558725104, 'given': 0.10235101443118594, 'if': 0.2020778426627266, 'local': 0.19994028742732853, 'mesh': 0.7965784284662087, 'navier': 0.35523150191913927, 'not': 0.13528517773688292, 'number': 0.07264932871949845, 'numerical': 0.23646742681441385, 'on': 0.044060228048051424, 'reynolds': 0.1578280080047599, 'show': 0.17638660772417045, 'size': 0.28445171299870836, 'solution': 0.16457423377136887, 'steady': 0.2958321322011587, 'stokes': 0.3336288129190638, 'that': 0.043764358022771316, 'to': 0.009002945218177212, 'two': 0.13477128421868342, 'under': 0.16702980441552476, 'used': 0.13404871682332475, 'value': 0.11951380431411825, 'viscous': 0.2020778426627266}

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2 1221 0.043331142468823795 steady flow of conducting fluids in channels under transverse magnetic fields, with consideration of hall effect .

Vector Representation for the Rank 2 With Document ID 1221

{'account': 0.25106876010190277, 'approximate': 0.1882429755844433, 'arbitrary': 0.24341411545136124, 'assumption': 0.21978804739357102, 'based': 0.1704307447358744, 'both': 0.16866193031101664, 'by': 0.04331179236839078, 'calculation': 0.17361674072744135, 'carried': 0.270211009225151, 'case': 0.11555798590132785, 'channel': 0.5638272909708307, 'conducting': 0.4735964499663502, 'cross': 0.26739815197031136, 'effect': 0.09218542078944494, 'electrically': 0.360269433606657, 'field': 0.1834313709581794, 'flow': 0.06220061601834868, 'fluid': 0.1921813145342394, 'fully': 0.3296722660314134, 'gas': 0.19392614336958838, 'hall': 0.5025196342446008, 'incompressible': 0.21074975241888858, 'into': 0.1818856631878697, 'ionized': 0.4545132958903335, 'laminar': 0.16233588617078312, 'magnetic': 0.44828997726494435, 'making': 0.36885503908586875, 'method': 0.0973636410119637 6, 'minimum': 0.3028753722576236, 'nonconducting': 0.4677370287671866, 'number': 0.11366923045277778, 'numerical': 0.1844775358789806, 'on': 0.047578484797422, 'out': 0.20793689516404892, 'presence': 0.270211009225151, 'presented': 0.12397011415191703, 'principle': 0.33559078227780864, 'rectangular': 0.27924930419983346, 'reynolds': 0.24694224337658496, 'section': 0.20322597653563415, 'simplifying': 0.4014093514806447, 'small': 0.15419672192711542, 'solution': 0.10854665920362061, 'steady': 0.23079027635009564, 'straight': 0.3387105610060959, 'taken': 0.2716527987994464, 'that': 0.06847497403473064, 'through': 0.20257362008142774, 'transverse': 0.2858513655793169, 'uniform': 0.21219154199318402, 'wall': 0.18239781074082373}

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3 1123 0.039486051007495346 an extension of donnell's equation for a circular cylindrical shell .

Vector Representation for the Rank 3 With Document ID 1123

{'agreement': 0.17549188555788003, 'approach': 0.25222024665695203, 'axial': 0.22725227141027599, 'between': 0.1415028515150645, 'buckling': 0.22639010877305443, 'can': 0.13535079247784257, 'circular': 0.30028767096120135, 'classical': 0.4450613362496161, 'compression': 0.2875844439235415, 'compressive': 0.3562787391713667, 'computation': 0.30080817680039457, 'critical': 0.3741450691762891, 'cylinder': 0.26577924259061636, 'cylindrical': 0.2393283689727511, 'donnell': 0.42391612831509007, 'donnells': 0.4157399959776291, 'easy': 0.4833773851213525, 'equation': 0.15727652646426243, 'equilibrium': 0.24553235789630273, 'from': 0.07070634769260985, 'furthermore': 0.3835971206320758, 'good': 0.2000126997486968, 'involved': 0.3028753722576236, 'known': 0.2373562255588418, 'obtained': 0.15386244767713833, 'physical': 0.2841526078838075, 'property': 0.2238544228750751, 'pure': 0.3488145151546617, 'readily': 0.3950520390840711, 'reduces': 0.37839647016748407, 'relation': 0.24237429107975692, 'shearing': 0.42391612831509007, 'shell': 0.2373562255588418, 'show': 0.19047126866708147, 'simple': 0.17549188555788003, 'simplifying': 0.4014093514806447, 'solution': 0.15727652646426243, 'still': 0.3524654687089807, 'stress': 0.27762588718919184, 'succeeded': 0.6214421478571256, 'tedious': 0.4833773851213525, 'that': 0.04725898923138793, 'thin': 0.21219154199318402, 'to': 0.009721840107770649, 'torsion': 0.36885503908586875, 'under': 0.26133963885470796, 'well': 0.1844775358789806}

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4 320 0.039187386506061045 comment on improved numerical solution of the blasius problem with three-point boundary conditions .

Vector Representation for the Rank 4 With Document ID 320

{'accurate': 0.270211009225151, 'attention': 0.31403190967724753, 'drawn': 0.3891335228376759, 'previous': 0.2841526078838075, 'problem': 0.12933338923453824, 'solution': 0.10854665920362061, 'to': 0.014086267179562515}

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5 437 0.037990977835128496 hypervelocity stagnation point heat transfer .

Vector Representation for the Rank 5 With Document ID 437

{'air': 0.1638426315893216, 'analysis': 0.13283120624992406, 'approximated': 0.34157954394707607, 'atom': 0.38499752796799536, 'can': 0.1253420912509042, 'charge': 0.42090368268483946, 'contribution': 0.34587469861049364, 'diffusion': 0.3052941951453023, 'e': 0.31977800375441295, 'effect': 0.08536864256989969, 'electrical': 0.35523150191913927, 'equilibrium': 0.2273761286881724, 'field': 0.1698672849712528, 'fourcomponent': 0.5754887502163468, 'gas': 0.24857886298271317, 'ii': 0.4331495683762693, 'iii': 0.4653601260677431, 'includes': 0.326401922980584, 'including': 0.2335694722805302, 'ionized': 0.42090368268483946, 'iv': 0.4882138804505711, 'local': 0.19994028742732853, 'low': 0.18759403405361602, 'magnetic': 0.28651523187277417, 'molecule': 0.326401922980584, 'n': 0.487439965921816, 'neglected': 0.4189756923801347, 'no': 0.2571922667550831, 'partially': 0.39256906491107807, 're': 0.302689338503849, 'separation': 0.21044778843644407, 'specific': 0.25571074646193387, 'thermal': 0.2263892711532442, 'thermochemical': 0.4882138804505711, 'tions': 0.5754887502163468, 'v': 0.326401922980584}

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Rankings Doc No Score Titles

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1 320 0.0402684943326255 comment on improved numerical solution of the blasius problem with three-point boundary conditions .

Vector Representation for the Rank 1 With Document ID 320

{'accurate': 0.5618011772797783, 'attention': 0.5880409419101723, 'drawn': 0.6330114612824701, 'previous': 0.5701493459299061, 'problem': 0.47744427105224063, 'solution': 0.4649972675032589, 'to': 0.4071860442032682}

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2 1085 0.033678812789023994 note on the convergence of numerical solutions of the navier-stokes equations .

Vector Representation for the Rank 2 With Document ID 1085

{'applies': 0.5589463612020397, 'based': 0.4760341376971451, 'case': 0.45155379579924376, 'certain': 0.4949905624393932, 'condition': 0.45542284080146045, 'converge': 0.6027716687999342, 'convergence': 0.5607267266558804, 'criterion': 0.5978102771494604, 'dimension': 0.6198614977962108, 'equation': 0.44842583798623703, 'exceeds': 0.589121377849413, 'fixed': 0.537035504583447, 'flow': 0.42774951321438937, 'given': 0.44930792210510934, 'if': 0.4973516342808837, 'local': 0.4963218603443172, 'mesh': 0.7792472762780542, 'navier': 0.5711338898129469, 'not': 0.46517405853667415, 'number': 0.43499904188930083, 'numerical': 0.512581039534955, 'on': 0.4212261530049351, 'reynolds': 0.4760341376971451, 'show': 0.48497480129906606, 'size': 0.537035504583447, 'solution': 0.47550237196430745, 'steady': 0.5408442990213085, 'stokes': 0.5607267266558804, 'that': 0.4210836166926101, 'to': 0.40433719708594495, 'two': 0.46416398013544674, 'under': 0.4804671319685806, 'used': 0.46457838961487047, 'value': 0.4575761499420005, 'viscous': 0.4973516342808837}

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3 1011 0.025934714092990776 free-flight measurements of the static and dynamic

Vector Representation for the Rank 3 With Document ID 1011

{'air': 0.5119489767252806, 'also': 0.4611214864401361, 'atmosphere': 0.5321604552867548, 'based': 0.4801993247708569, 'bureau': 0.6364698658858337, 'by': 0.4203811613212375, 'calculated': 0.4878122707460959, 'chart': 0.6377520352424009, 'chemical': 0.5489106834747157, 'composition': 0.5858990103751137, 'data': 0.4756320434434098, 'equilibrium': 0.5155397715546973, 'exponent': 0.5994815389854357, 'from': 0.43327217369582455, 'included': 0.5103391161148044, 'isentropic':

0.5888905607691037, 'k': 0.5593864905510157, 'national': 0.5994815389854357, 'on': 0.4223889319986674, 'prepared': 0.6274621281290151, 'pressure': 0.4392871870570768, 'property': 0.5053388201135516, 'relating': 0.5735715297076205, 'showing': 0.5757540859480952, 'sound': 0.5500808366287394, 'speed': 0.4722136025442064, 'standard': 0.5715009498418562, 'temperature': 0.4674973547750857, 'thermodynamic': 0.6184951495975157, 'these': 0.4522187356272775, 'to': 0.4061514545690097}

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4 1221 0.023674621433502522 steady flow of conducting fluids in channels under transverse magnetic fields, with consideration of hall effect .

Vector Representation for the Rank 4 With Document ID 1221

{'account': 0.5023448839626615, 'approximate': 0.476734777696582, 'arbitrary': 0.4992245685629395, 'assumption': 0.48959371208805563, 'based': 0.469473855634542, 'both': 0.4687528216556827, 'by': 0.4176554835510348, 'calculation': 0.47077258507395964, 'carried': 0.5101479705135652, 'case': 0.44710569587881055, 'channel': 0.6230694190397839, 'conducting': 0.5873710028675488, 'cross': 0.5090013461815166, 'effect': 0.43757817655177633, 'electrically': 0.5468591049033809, 'field': 0.474773390238623, 'flow': 0.425355264534784, 'fluid': 0.478340189865977, 'fully': 0.5343865712285285, 'gas': 0.4790514464341618, 'hall': 0.6048455316975654, 'incompressible': 0.4859093697986018, 'into': 0.47414330275849076, 'ionized': 0.5852763781065509, 'laminar': 0.4661740928117911, 'magnetic': 0.5773588940997582, 'making': 0.5503589142630259, 'method': 0.43968901004452826, 'minimum': 0.5234631692779028, 'nonconducting': 0.5906668592093588, 'number': 0.44497144711839115, 'numerical': 0.47519984563427536, 'on': 0.4193947447055342, 'out': 0.4847627454665533, 'presence': 0.5101479705135652, 'presented': 0.45053478952365966, 'principle': 0.536799176676624, 'rectangular': 0.513832312803019, 'reynolds': 0.49769882311221003, 'section': 0.48284240133378675, 'simplifying': 0.5636292523296786, 'small': 0.46285626936082447, 'solution': 0.444247620596924, 'steady': 0.49407862628219557, 'straight': 0.5380709135179823, 'taken': 0.5107356971053559, 'that': 0.42709104883942534, 'through': 0.48257647678952664, 'transverse': 0.5165235564508681, 'uniform': 0.4864970963903926, 'wall': 0.47435207298485255}

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5 1189 0.022808032390861082 nonequilibrium flow past a wedge .

Vector Representation for the Rank 5 With Document ID 1189

{'amount': 0.5639812278496725, 'attached': 0.5286368618596662, 'both': 0.4640551075997079, 'by': 0.416449127051834, 'characterized': 0.5477866975081845, 'chemically': 0.5835790113282681, 'concave': 0.5726168911980698, 'contained': 0.5550566180233181, 'convex': 0.5726168911980698, 'depending': 0.5437089363748653, 'describing': 0.5550566180233181, 'dissociation': 0.5864080591890604, 'easily': 0.5456840603668864, 'either': 0.5394295651120912, 'energy': 0.5243580567601877, 'entropy': 0.5500344554598122, 'equilibrium': 0.5338484144710529, 'exact': 0.48470155396692705, 'example': 0.47819228048593976, 'field': 0.46966430528941155, 'flow': 0.43390776639181255, 'freestream': 0.6381693627228264, 'gas': 0.47365005224966283, 'identifiable': 0.6360138033199166, 'illustrating': 0.568266496105144, 'layer': 0.4590544009982829, 'nonreacting': 0.6360138033199166, 'numerical': 0.5176377537791284, 'obtained': 0.4403294118196675, 'on': 0.4180695486972668, 'out': 0.4789711120293774, 'parameter': 0.47170119151424383, 'past': 0.5026218260316695, 'presence': 0.5026218260316695, 'presentation': 0.5609965755900106, 'presented': 0.44708186955115403, 'reacting': 0.5835790113282681, 'regime': 0.5263087596797719, 'relative': 0.5158317041134954, 'relaxation': 0.5324741822850606, 'result': 0.425349601250439, 'shock': 0.4581428655328161, 'shown': 0.4518581474150687, 'solution': 0.4412242876744936, 'straight': 0.5286368618596662, 'these': 0.44214443933203046, 'to': 0.40529972055542984, 'value': 0.44901382954020097, 'wave': 0.462433899112719, 'wedge': 0.5158317041134954}

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Query No: 5

Query Vector for weight (Version 1) are:

[('aerodynamic', 0.07215220853242434),

('applicable', 0.09387218755408672),

('chemical', 0.07215220853242434),

('hypersonic', 0.09387218755408672),

('kinetic', 0.09387218755408672),

('problem', 0.04343995804332474),

('system', 0.09387218755408672),

('to', 0.03772685626663931)]

Query Vector for weight (Version 2) are:

[('aerodynamic', 0.07250110412252518),

('applicable', 0.07927461139896373),

('chemical', 0.07250110412252518),

('hypersonic', 0.07927461139896373),

('kinetic', 0.07927461139896373),

('problem', 0.06354701455287709),

('system', 0.07927461139896373),

('to', 0.061765349091008205)]

Ranks Document Number Scores Titles

1 1305 0.027686501952076226 a proposed programme of wind tunnel tests at hypersonic speeds to investigate the lifting properties of geometrically slender shapes .

Vector Representation for the Rank 1 With Document ID 1305

{'aerodynamic': 0.19814096454326377, 'aim': 0.4545132958903335, 'at': 0.055861380633815266, 'based': 0.1704307447358744, 'body': 0.13961047050608286, 'built': 0.5619808910508631, 'by': 0.04331179236839078, 'compromise': 0.4677370287671866, 'configuration': 0.2488111440108371, 'described': 0.22220467087088383, 'enforced': 0.5619808910508631, 'from': 0.07070634769260985, 'generated': 0.3387105610060959, 'geometric': 0.4157399959776291, 'ha': 0.11966097837637452, 'heating': 0.2545706528709851, 'hypersonic': 0.19451572961012958, 'investigating': 0.4329544232897724, 'later': 0.4157399959776291, 'lift': 0.20521335021328854, 'lifting': 0.32685940877657377, 'may': 0.15419672192711542, 'model': 0.18036731451851562, 'on': 0.06893790079097756, 'programme': 0.6585580149026898, 'shape': 0.17549188555788003, 'simple': 0.17549188555788003, 'slender': 0.2413469199941321, 'speed': 0.1534603701070292, 'test': 0.15875271962933116, 'that': 0.04725898923138793, 'up': 0.2058861729589721}

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2 320 0.02739724057939687 comment on improved numerical solution of the blasius problem with three-point boundary conditions .

Vector Representation for the Rank 2 With Document ID 320

{'accurate': 0.270211009225151, 'attention': 0.31403190967724753, 'drawn': 0.3891335228376759, 'previous': 0.2841526078838075, 'problem': 0.12933338923453824, 'solution': 0.10854665920362061, 'to': 0.014086267179562515}

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3 650 0.02711217358112592 some design problems of hovercraft .

Vector Representation for the Rank 3 With Document ID 650

{'aerodynamic': 0.19814096454326377, 'analysis': 0.14343792139007638, 'angle': 0.163564324255595, 'considered': 0.15993055680978174, 'cushion': 0.5271982855734489, 'drag': 0.19938423935311986, 'dynamic': 0.2660255713229804, 'each': 0.22900303544888745, 'economics': 0.6214421478571256, 'effect': 0.13357023494580939, 'examined': 0.29681748236510425, 'ground': 0.32685940877657377, 'influence': 0.23638689930953372, 'jet': 0.335714298746996, 'lift': 0.20521335021328854, 'machine': 0.37839647016748407, 'on': 0.047578484797422, 'operation': 0.3453126223855793, 'optimum': 0.3387105610060959, 'over': 0.14813042879608032, 'parameter': 0.18879464604080065, 'performance': 0.3028753722576236, 'peripheral': 0.5271982855734489, 'power': 0.24237429107975692, 'pressure': 0.0834887895608359, 'ratio': 0.195256628072377, 'related': 0.3071654891969682, 'requirement': 0.3296722660314134, 'simple': 0.17549188555788003, 'stability': 0.23261554649289723, 'structural': 0.3241358638258134, 'system': 0.24341411545136124, 'then': 0.2058861729589721, 'thickness': 0.1813765551041639, 'to': 0.009721840107770649, 'various': 0.19047126866708147, 'wave': 0.16439316606881269, 'weight': 0.3241358638258134}

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4 925 0.026641728293507312 factors affecting loads at hypersonic speeds .

Vector Representation for the Rank 4 With Document ID 925

{'aerodynamic': 0.19814096454326377, 'aircraft': 0.2660255713229804, 'at': 0.055861380633815266, 'blunt': 0.22812318711727908, 'both': 0.16866193031101664, 'boundary': 0.09603948854195138, 'brief': 0.3296722660314134, 'can': 0.13535079247784257, 'characteristic': 0.1813765551041639, 'component': 0.2716527987994464, 'configuration': 0.2488111440108371, 'current': 0.360269433606657, 'deal': 0.3453126223855793, 'designer': 0.44305837743833826, 'discussed': 0.1648106095218505, 'effect': 0.09218542078944494, 'employ': 0.44305837743833826, 'estimating': 0.360269433606657, 'give': 0.20322597653563415, 'hypersonic': 0.19451572961012958, 'information': 0.29681748236510425, 'interference': 0.29681748236510425, 'layer': 0.10832975779775116, 'load': 0.31173720439012015, 'method': 0.09736364101196376, 'on': 0.047578484797422, 'paper': 0.24186824538519194, 'several': 0.21666826866528383, 'slender': 0.2413469199941321, 'speed': 0.1534603701070292, 'summary': 0.3891335228376759, 'touch': 0.5619808910508631, 'upon': 0.2545706528709851, 'various': 0.19047126866708147}

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5 1032 0.025572069704237636 on the conservativeness of various distributed force systems .

Vector Representation for the Rank 5 With Document ID 1032

{'applicable': 0.23574607446188983, 'buckling': 0.2901918990988599, 'cantilever': 0.38499752796799536, 'cause': 0.2977226582022197, 'change': 0.285879172313337, 'character': 0.3375047528367761, 'column': 0.3166622706901821, 'conservative': 0.6427251885284571, 'conservativeness': 0.5754887502163468, 'constant': 0.1638426315893216, 'could': 0.24762502642954715, 'determination': 0.2679566321533636, 'determining': 0.2748689038193916, 'directional': 0.44763337698537986, 'discussed': 0.1526234614487881, 'eight': 0.4331495683762693, 'employed': 0.26631861515333216, 'end': 0.29081038653619173, 'example': 0.1906616356350296, 'force': 0.17331108777644477, 'generally': 0.27133761090628217, 'instability': 0.4121009265608575, 'kinetic': 0.3336288129190638, 'large': 0.15865985864180726, 'load': 0.32620196226288284, 'loading': 0.3540887685506807, 'magnitude': 0.2346503190209996, 'make': 0.2977226582022197, 'method': 0.12480289020385103, 'necessity': 0.42090368268483946, 'nonconservative': 0.4882138804505711, 'nongyroscopic': 0.5754887502163468, 'only': 0.15458506753150733, 'otherwise': 0.38499752796799536, 'problem': 0.11976965319858021, 'reference': 0.38299521744021364, 'shown': 0.12644930095033347, 'small': 0.14279443242670897, 'statical': 0.5754887502163468, 'system': 0.3690550389431708, 'tangential': 0.42090368268483946, 'that': 0.060577628187355376, 'time':

0.17691097273004497, 'usually': 0.3136641409190199, 'valid': 0.2679566321533636, 'whereas': 0.3375047528367761}

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Rankings Doc No Score Titles

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1 320 0.04264064346845989 comment on improved numerical solution of the blasius problem with three-point boundary conditions .

Vector Representation for the Rank 1 With Document ID 320

{'accurate': 0.5618011772797783, 'attention': 0.5880409419101723, 'drawn': 0.6330114612824701, 'previous': 0.5701493459299061, 'problem': 0.47744427105224063, 'solution': 0.4649972675032589, 'to': 0.4071860442032682}

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2 533 0.01876121226943204 stagnation-point shock-detachment distance for flow around spheres and cylinders in air .

Vector Representation for the Rank 2 With Document ID 533

{'arbitrarily': 0.633153928549836, 'arc': 0.6109784688099826, 'author': 0.5310851791301352, 'bar': 0.657255429791618, 'cantilevered': 0.657255429791618, 'circular': 0.5139863511514744, 'deflection': 0.5393631047510348, 'discus': 0.5918480310403907, 'end': 0.5727175932707989, 'inclined': 0.633153928549836, 'initially': 0.5918480310403907, 'load': 0.518332485422561, 'problem': 0.47113338176716935, 'shape': 0.4965205610578357, 'subjected': 0.5518712767739752, 'to': 0.40534701338887325}

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3 650 0.01689370874377457 some design problems of hovercraft .

Vector Representation for the Rank 3 With Document ID 650

{'aerodynamic': 0.4923193697861977, 'analysis': 0.4668317050777384, 'angle': 0.47620915427352095, 'considered': 0.4745160812569422, 'cushion': 0.6456363003415054, 'drag': 0.4928986459958475, 'dynamic': 0.5239486905101255, 'each': 0.5066988644195854, 'economics': 0.6895471291411022, 'effect': 0.4579419469798412, 'examined': 0.5382954957175909, 'ground': 0.5522928622887253, 'influence': 0.510139211345186, 'jet': 0.545630799453672, 'lift': 0.4956145903855658, 'machine': 0.5763054083021599, 'on': 0.4221681354080676, 'operation': 0.5608907262127273, 'optimum': 0.5578146427423119, 'over': 0.46901807440039683, 'parameter': 0.48796466082453793, 'performance': 0.5411180346024739, 'peripheral': 0.6456363003415054, 'power': 0.5129289031999936, 'pressure': 0.4388997421822175, 'ratio': 0.48470112518572905, 'related': 0.5431169190485163, 'requirement': 0.5536034504836699, 'simple': 0.4817665358329145, 'stability': 0.5083820334891286, 'structural': 0.5510238871728619, 'system': 0.5134133862088258, 'then': 0.495928077160007, 'thickness': 0.4845083665551241, 'to': 0.4045296748907044, 'various': 0.48874584579849983, 'wave': 0.4765953346579007, 'weight': 0.5510238871728619}

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4 5 0.01650968507522481 one-dimensional transient heat conduction into a double-layer slab subjected to a linear heat input for a small time internal .

Vector Representation for the Rank 4 With Document ID 5

{'aerodynamic': 0.5041287615243675, 'analytic': 0.5833120351892043, 'at': 0.42935675818399677, 'composite': 0.63283988867217, 'conduction': 0.5625953090840068, 'during': 0.5511338760687907, 'example': 0.5081990907565628, 'exposed': 0.6227800875674897, 'heat': 0.49942742140135155, 'heating': 0.5732608455807672, 'may': 0.4810348012708999, 'occur': 0.5405254005034051, 'one': 0.47589794394599705, 'presented': 0.4651498516847835, 'rate': 0.5327915003622148, 'slab': 0.6109521306224008, 'solution': 0.45704438361110655, 'surface': 0.4663964434136795, 'to': 0.4051091058958636, 'transient': 0.5732522340845239, 'triangular': 0.5938439054769377, 'type': 0.4934889098794988}

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5 1032 0.016165417077079886 on the conservativeness of various distributed force systems .

Vector Representation for the Rank 5 With Document ID 1032

{'applicable': 0.4994807480384074, 'buckling': 0.525956631757778, 'cantilever': 0.5624622686193882, 'cause': 0.5256337897186399, 'change': 0.5240847099664293, 'character': 0.5424211425592497, 'column': 0.5336259771693144, 'conservative': 0.6746479167590704, 'conservativeness': 0.6428462551916863, 'constant': 0.4691387442539231, 'could': 0.5044934594074185, 'determination': 0.513073043821895, 'determining': 0.5159899023848667, 'directional': 0.5888935087937711, 'discussed': 0.46440444935421793, 'eight': 0.5827815931736772, 'employed': 0.5123818291035387, 'end': 0.5227169311556682, 'example': 0.48045589806105216, 'force': 0.4731342682787194, 'generally': 0.5144997581212105, 'instability': 0.5788707569544589, 'kinetic': 0.5407855632468642, 'large': 0.46695170410528514, 'load': 0.5393919064901485, 'loading': 0.5513084353405939, 'magnitude': 0.4990183582778325, 'make': 0.5256337897186399, 'method': 0.4541701947315821, 'necessity': 0.5776140421476125, 'nonconservative': 0.6060177762909379, 'nongyroscopic': 0.6428462551916863, 'only': 0.46523221304407375, 'otherwise': 0.5624622686193882, 'problem': 0.45054071300950344, 'reference': 0.5662375404617097, 'shown': 0.45335940832179755, 'small': 0.4602567698569472, 'statical': 0.6428462551916863, 'system': 0.5577037891532575, 'tangential': 0.5776140421476125, 'that': 0.42629347693732467, 'time': 0.4746533571918807, 'usually': 0.5323608184894414, 'valid': 0.513073043821895, 'whereas': 0.5424211425592497}

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Query No: 6

Query Vector for weight (Version 1) are:

[('behaviour', 0.07509775004326938),

('couette', 0.07509775004326938),

('do', 0.07509775004326938),

('experimental', 0.05772176682593947),

('flow', 0.026317198032507965),

('guide', 0.07509775004326938),

('theoretical', 0.07509775004326938),

('to', 0.03018148501331145),

('turbulent', 0.07509775004326938),

('we', 0.07509775004326938)]

Query Vector for weight (Version 2) are:

[('behaviour', 0.061220657276995306),

('couette', 0.061220657276995306),

('do', 0.061220657276995306),

('experimental', 0.05631065951416849),

('flow', 0.047436550890231625),

('guide', 0.061220657276995306),

('theoretical', 0.061220657276995306),

('to', 0.04852849718146322),

('turbulent', 0.061220657276995306),

('we', 0.061220657276995306)]

Ranks Document Number Scores Titles

1 271 0.06634169262556346 an experimental test of compressibility transformation for turbulent boundary layer .

Vector Representation for the Rank 1 With Document ID 271

{'application': 0.2488017333158573, 'boundary': 0.11605826108957569, 'by': 0.05233983836505397, 'co': 0.445740341606817, 'discussion': 0.3182369617027767, 'experimental': 0.16108273106391074, 'graphically': 0.5122785371621799, 'illustrated': 0.4215225079418247, 'insulated': 0.445740341606817, 'layer': 0.13091035265946915, 'light': 0.4132248292166513, 'mager': 0.6370891515767835, 'matting': 0.7509775004326937, 'measurement': 0.23224019116896719, 'theory': 0.12237131028024509, 'transformation': 0.3711920282390608, 'turbulent': 0.2512799144964561, 'various': 0.23017369797185824, 'wall': 0.22041738312547052, 'worker': 0.5652336036984639}

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2 1146 0.04903248230452948 thermal buckling of cylinders .

Vector Representation for the Rank 2 With Document ID 1146

{'among': 0.5492534744193474, 'area': 0.3282769611482099, 'axial': 0.2746214484161083, 'both': 0.2038183526493618, 'buckling': 0.27357957389166593, 'circumferential': 0.4132248292166513, 'cylinder': 0.2216663818798242, 'difference': 0.31204612886278377, 'discussed': 0.19916425046207756, 'due': 0.24094451625367497, 'exist': 0.40190461444533776, 'experimental': 0.16108273106391074, 'future': 0.47024573618458926, 'indicated': 0.30479382682054995, 'investigation': 0.19815778000687356, 'on': 0.05749589356104888, 'result': 0.08066045255080079, 'reviewed': 0.4305425982496091, 'several': 0.26183128290606894, 'stress': 0.23154677291407538, 'that': 0.057109801336041384, 'theoretical': 0.20069251857152517, 'thermal': 0.2954241050090529, 'to': 0.011748290985597008, 'various': 0.23017369797185824, 'work': 0.288016265589427 56}

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3 1045 0.04033704738240432 the bending strength of pressurized cylinders .

Vector Representation for the Rank 3 With Document ID 1045

{'cylinder': 0.2216663818798242, 'data': 0.19422685815856466, 'discussion': 0.3182369617027767, 'experimental': 0.16108273106391074, 'loading': 0.2822233819620548, 'membrane': 0.5122785371621799, 'presented': 0.14981083400150466, 'pressurized': 0.47024573618458926, 'previously': 0.33368683078438854, 'term': 0.22616033318930492, 'theory': 0.12237131028024509}

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4 137 0.03607041542947623 the generation of sound by aerodynamic means .

Vector Representation for the Rank 4 With Document ID 137

{'aerodynamic': 0.19814096454326377, 'cold': 0.4082757719609241, 'experimental': 0.13329773304442719, 'from': 0.07070634769260985, 'general': 0.1639777441416276, 'given': 0.11052385336735143, 'important': 0.25106876010190277, 'jet': 0.23169805688805684, 'lighthills': 0.4833773851213525, 'more': 0.1871501651331313, 'noise': 0.49545890178502827, 'prediction': 0.24770423239070574, 'radiated': 0.5619808910508631, 'related': 0.3071654891969682, 'relating': 0.36885503908586875, 'result': 0.066747412341137, 'subsonic': 0.22900303544888745, 'summary': 0.3891335228376759, 'then': 0.2058861729589721, 'theory': 0.10126360623697798, 'these': 0.11096948792961203, 'to': 0.014086267179562515, 'turbulent': 0.20793689516404892}

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5 385 0.032149786160932316 on a generalised porous-wall ?couette type? flow .

Vector Representation for the Rank 5 With Document ID 385

{'above': 0.3135595227857385, 'below': 0.3231354623747757, 'by': 0.05233983836505397, 'can': 0.16356373665206167, 'considered': 0.19326698423974895, 'couette': 0.5122785371621799, 'different': 0.26753909008830196, 'fixed': 0.3711920282390608, 'flow': 0.0751659077259313, 'ha': 0.14460348843458312, 'interpretation': 0.47024573618458926, 'made': 0.14312040673633072, 'method': 0.11765842405816515, 'obtained': 0.1283250405536718, 'one': 0.1745258659461375, 'paper': 0.20172402601334635, 'parameter': 0.22814759486090103, 'porous': 0.40554237866270815, 'problem': 0.15629204698258145, 'quoted': 0.6370891515767835, 'recent': 0.33939463796662156, 'reference': 0.36107027355075894, 'result': 0.08066045255080079, 'rigorously': 0.6791219525543741, 'stated': 0.5122785371621799, 'to': 0.011748290985597008, 'type': 0.21497595461465033, 'wall': 0.22041738312547052}

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Rankings Doc No Score Titles

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1 137 0.023339981345289654 the generation of sound by aerodynamic means .

Vector Representation for the Rank 1 With Document ID 137

{'aerodynamic': 0.501862647221912, 'cold': 0.6098912308435276, 'experimental': 0.4685272729336106, 'from': 0.4363495543082892, 'general': 0.4842996153887019, 'given': 0.45681940789536546, 'important': 0.5290723934732781, 'jet': 0.5191140735849062, 'lighthills': 0.6485003551343647, 'more': 0.4962123672528919, 'noise': 0.629424939991939, 'prediction': 0.5273427173303158, 'radiated': 0.6889097738194895, 'related': 0.5579112625041499, 'relating': 0.5896253549034505, 'result': 0.4343142980652856, 'subsonic': 0.5177285851335585, 'summary': 0.6000503573322369, 'then': 0.5058443954400459, 'theory': 0.4520587906812356, 'these': 0.45704850497435706, 'to': 0.40652272265315714, 'turbulent': 0.506898654931552}

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2 1146 0.023303603039447045 thermal buckling of cylinders .

Vector Representation for the Rank 2 With Document ID 1146

{'among': 0.6349397893729108, 'area': 0.5404184474020378, 'axial': 0.5174676324375955, 'both': 0.48718204448756053, 'buckling': 0.5170219770294359, 'circumferential': 0.5767543745489275, 'cylinder': 0.49481642901750694, 'difference': 0.5334758089007223, 'discussed': 0.4851912809539179, 'due': 0.5030625322107244, 'exist': 0.5719122224317468, 'experimental': 0.46890214567650507, 'future': 0.6011447161613533, 'indicated': 0.530373681388334, 'investigation': 0.4847607694182272, 'on': 0.42459351420092595, 'result': 0.43450201157679064, 'reviewed': 0.5841619435466713, 'several': 0.5119967179492529, 'stress': 0.49904270540285517, 'that': 0.42442836563064573, 'theoretical': 0.4858449882210745, 'thermal': 0.5263658406164518, 'to': 0.40502525908018294, 'various': 0.49845538105673476, 'work': 0.5231971829492517}

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3 271 0.022165310671638114 an experimental test of compressibility transformation for turbulent boundary layer .

Vector Representation for the Rank 3 With Document ID 271

{'application': 0.5100350333442017, 'boundary': 0.4513279166453765, 'by': 0.4231478124487881, 'co': 0.5971330854407515, 'discussion': 0.5407434515251854, 'experimental': 0.47124043489395906, 'graphically': 0.6265602621288759, 'illustrated': 0.5864225083907566, 'insulated': 0.5971330854407515, 'layer': 0.45789640139564014, 'light': 0.582752777705863, 'mager': 0.6817589938088772, 'matting': 0.7321272452549672, 'measurement': 0.5027105271276354, 'theory': 0.4541199252417034, 'transformation': 0.5641633547324798, 'turbulent': 0.511131033541652, 'various': 0.501796600022631, 'wall': 0.4974817730512452, 'worker': 0.649980165336170 3}

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4 418 0.02120979886816254 transition form laminar to turbulent shear flow .

Vector Representation for the Rank 4 With Document ID 418

{'also': 0.4620484992561947, 'behavior': 0.527737539327024, 'certain': 0.5017138095046755, 'character': 0.5741020576965439, 'common': 0.5807620345655666, 'dimensional': 0.47813555983145656, 'emphasized': 0.5986012382460496, 'examined': 0.5417913121208494, 'experimental': 0.4636770459762046, 'feature': 0.5390883744311994, 'flow': 0.4297135697321165, 'from': 0.4337768036259943, 'laminar': 0.4775487283331338, 'latter': 0.5446851987938972, 'layer': 0.45174970954366805, 'nonlinear': 0.542733415665831, 'process': 0.5233538540292597, 'random': 0.5807620345655666, 'recent': 0.5341648966536537, 'related': 0.5467346107932662, 'reviewed': 0.5701962751834495, 'shear': 0.5529705691778546, 'stability': 0.5111217011010334, 'stage': 0.5633504490192568, 'study': 0.4896628326630901, 'theory': 0.4483741708339421, 'three': 0.4970821450287198, 'to': 0.4062138701781363, 'transition': 0.553611869061374, 'turbulent': 0.4993325762644239, 'unsteadiness': 0.630911983821744, 'viscous': 0.5042419934141606}

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5 286 0.019849492848678582 effect of roll on dynamic instability of symmetric missiles .

Vector Representation for the Rank 5 With Document ID 286

{'attempt': 0.575414410967581, 'by': 0.42382149172611616, 'certain': 0.5171069239223595, 'condition': 0.46832677094041564, 'describing': 0.6245517304160044, 'discussion': 0.5448395598257829, 'dynamic': 0.5463141006104051, 'experimental': 0.4733137714047885, 'extend': 0.6140234907802441, 'form': 0.48688703301081027, 'generalized': 0.5727175932707989, 'instability': 0.576822917500825, 'neater': 0.7417932663124371, 'note': 0.5374629231921529, 'on': 0.426168173145614, 'result': 0.43671108591627966, 'slightly': 0.5701666225677666, 'stability': 0.527938582384565, 'stating': 0.7090895669368236, 'to': 0.40534701338887325}

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Query No: 7

Query Vector for weight (Version 1) are:

[('angle', 0.02591894215630066),

('at', 0.02591894215630066),

('attack', 0.02591894215630066),

('available', 0.015175718197747112),

('distribution', 0.02171154427744459),

('equivalent', 0.028247370357142074),

('forebody', 0.0409284663767219),

('lower', 0.028247370357142074),

('ogive', 0.0409284663767219),

('possible', 0.02171154427744459),

('pressure', 0.02591894215630066),

('relate', 0.028247370357142074),

('surface', 0.028247370357142074),

('to', 0.016448986738685466),

('zero', 0.028247370357142074)]

Query Vector for weight (Version 2) are:

[('angle', 0.024554507064490784),

('at', 0.024554507064490784),

('attack', 0.024554507064490784),

('available', 0.021496506897400736),

('distribution', 0.022924065624512546),

('equivalent', 0.024351624351624353),

('forebody', 0.02824489795918367),

('lower', 0.024351624351624353),

('ogive', 0.02824489795918367),

('possible', 0.022924065624512546),

('pressure', 0.024554507064490784),

('relate', 0.024351624351624353),

('surface', 0.024351624351624353),

('to', 0.022226129646719852),

('zero', 0.024351624351624353)]

Ranks Document Number Scores Titles

1 492 0.18071694073878994 prediction of ogive-forebody pressures at angles of attack .

Vector Representation for the Rank 1 With Document ID 492

{'angle': 0.24798988319115764, 'approximate': 0.17432308885010464, 'approximation': 0.1840627411405065, 'arbitrary': 0.22541452260545322, 'at': 0.07160436566891452, 'attack': 0.3308475657709923, 'being': 0.21980459174508976, 'body': 0.12928678150606152, 'by': 0.04010904208165435, 'calculated': 0.1728098810037261, 'distribution': 0.11675254337477482, 'forebody': 0.41029581399344117, 'lower': 0.23798399737957068, 'method': 0.09016395214855977, 'not': 0.13528517773688292, 'obtaining': 0.4426294338386114, 'ogive': 0.3780852563019674, 'on': 0.044060228048051424, 'over': 0.13717671971690412, 'present': 0.14847120469611422, 'pressure': 0.12658246390336925, 'suggested': 0.2730836374538286, 'surface': 0.16194823636556005, 'utilizing': 0.35041542073362547, 'various': 0.17638660772417045, 'zero': 0.18819815110911567}

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2 3 0.07176536697595873 the boundary layer in simple shear flow past a flat plate .

Vector Representation for the Rank 2 With Document ID 3

{'boundary': 0.11605826108957569, 'equation': 0.13117246567543026, 'flow': 0.0751659077259313, 'gradient': 0.26464590763439305, 'incompressible': 0.2546790925496304, 'layer': 0.13091035265946915, 'no': 0.24246903847276882, 'presented': 0.14981083400150466, 'pressure': 0.10089145500469422, 'steady': 0.27889692621462275}

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3 973 0.06948053485214382 interaction effects produced by jet exhausting laterally near base of ogive-cylinder model in supersonic main stream .

Vector Representation for the Rank 3 With Document ID 973

{'angle': 0.14101705678596077, 'appears': 0.2494660437074085, 'attack': 0.18813327934777807, 'base': 0.24498230053647563, 'boundary': 0.08280048886609036, 'condition': 0.10710534926064463, 'cylinder': 0.15814544016527124, 'determined': 0.17189921293073615, 'diameter': 0.21261614994569597, 'discussed': 0.14209154219690176, 'effect': 0.0794777025947831, 'exhausting':

0.3354916442632778, 'experimentally': 0.2559013278490896, 'force': 0.24679866755266158, 'forebody': 0.38198298226136923, 'found': 0.10915673501714981, 'free': 0.14693694433595458, 'independent': 0.2464468852587461, 'interaction': 0.3281122342074664, 'inversely': 0.4032596927645894, 'jet': 0.33692180843316166, 'laminar': 0.1399579583306445, 'layer': 0.09339655011262211, 'length': 0.19444641794294298, 'mach': 0.09703304743183391, 'mainstream': 0.39185884543125793, 'model': 0.15550376250778733, 'near': 0.1929961928191265, 'number': 0.06763609643846907, 'ogive': 0.35199514307886237, 'presented': 0.1068808904795443, 'pressure': 0.07197989801305217, 'product': 0.3220073038963556, 'proportional': 0.30073059339313546, 'ratio': 0.17770961812410752, 'root': 0.3071658775348166, 'side': 0.2818019884118769, 'square': 0.2464468852587461, 'stagnation': 0.17927288904042307, 'stream': 0.13520665720800554, 'to': 0.015188176552939726, 'tobody': 0.5357766313185501, 'turbulent': 0.17927288904042307}

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4 430 0.06308232476783754 calibration of the flow in the mach 4 working section of the 4ft . x 3ft . high supersonic speed wind tunnel at rae bedford .

Vector Representation for the Rank 4 With Document ID 430

{'angle': 0.163564324255595, 'distribution': 0.12607535993592625, 'flow': 0.06220061601834868, 'ft': 0.46965022359082137, 'high': 0.1639777441416276, 'humidity': 0.5271982855734489, 'mach': 0.16307374923830095, 'nozzle': 0.24553235789630273, 'number': 0.07845045600431105, 'presented': 0.12397011415191703, 'pressure': 0.0834887895608359, 'range': 0.13837168420922066, 'section': 0.20322597653563415, 'speed': 0.1534603701070292, 'supersonic': 0.15993055680978174, 'total': 0.23833663006222613, 'tunnel': 0.17936980955453063, 'wind': 0.21074975241888858, 'working': 0.37839647016748407, 'x': 0.23448049951385272}

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5 312 0.06007420948926314 chordwise pressure distributions over several naca 16 series airfoils at transonic mach numbers up to 1.25 .

Vector Representation for the Rank 5 With Document ID 312

{'airfoil': 0.3409975204723399, 'analysis': 0.13283120624992406, 'angle': 0.15146933446727653, 'apparatus': 0.3780852563019674, 'at': 0.0517306337157308, 'attack': 0.2020778426627266, 'coefficient': 0.14629460251475457, 'design': 0.19717684323293277, 'dimensional': 0.15146933446727653, 'distribution': 0.11675254337477482, 'flow': 0.05760110558725104, 'from': 0.10720222141940526, 'investigation': 0.15185218344903273, 'langley': 0.31977800375441295, 'lift': 0.19003856569623367, 'mach': 0.10422520119775185, 'naca': 0.3136641409190199, 'number': 0.10055954713058654, 'over': 0.13717671971690412, 'photograph': 0.34587469861049364, 'presented': 0.11480297289695095, 'pressure': 0.07731509574482126, 'schlieren': 0.326401922980584, 'series': 0.22350018877046007, 'several': 0.200646434387632, 'test': 0.14701353058842473, 'thickness': 0.16796441531262127, 'to': 0.014739876826450955, 'transonic': 0.2615979586158803, 'tunnel': 0.1661060613333444, 'two': 0.09736562672102574, 'wind': 0.1951655709966986, 'without': 0.2325031339886373, 'x': 0.3005623426939801}

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Rankings Doc No Score Titles

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1 492 0.11103828877236416 prediction of ogive-forebody pressures at angles of attack .

Vector Representation for the Rank 1 With Document ID 492

{'angle': 0.5184205210342274, 'approximate': 0.49084321407129006, 'approximation': 0.49591873977378437, 'arbitrary': 0.5174679720678466, 'at': 0.43594786105313904, 'attack': 0.55798685259796, 'being': 0.5145445259917428, 'body': 0.467373902369538, 'by': 0.4209016161889557, 'calculated': 0.49005465149343713, 'distribution': 0.4608420626385423, 'forebody': 0.613813274586994, 'lower': 0.5240181743112837, 'method': 0.44698622116309666, 'not': 0.4704997854437502, 'obtaining': 0.622215241660515, 'ogive': 0.5970277150433683, 'on': 0.4229606574493451, 'over': 0.47148550543155776, 'present': 0.47737128524167577, 'pressure': 0.4604458582597847, 'suggested': 0.5423092919029, 'surface': 0.4813035999171965, 'utilizing': 0.5826084157271793, 'various': 0.49191855462458933, 'zero': 0.4980737838102857}

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2 312 0.05433188208462265 chordwise pressure distributions over several naca 16 series airfoils at transonic mach numbers up to 1.25 .

Vector Representation for the Rank 2 With Document ID 312

{'airfoil': 0.5683265922960555, 'analysis': 0.4674973547750857, 'angle': 0.4769682041947859, 'apparatus': 0.5921216813451747, 'at': 0.426286601132576, 'attack': 0.5026846041940374, 'coefficient': 0.4743386962024534, 'design': 0.5001941916877859, 'dimensional': 0.4769682041947859, 'distribution': 0.4593270818171559, 'flow': 0.42926964505573084, 'from': 0.45054589326601535, 'investigation': 0.4771627465337168, 'langley': 0.5624932120850377, 'lift': 0.4965669201679364, 'mach': 0.4529613904771219, 'naca': 0.5593864905510157, 'number': 0.44963920519973183, 'over': 0.46970550052969695, 'photograph': 0.5757540859480952, 'presented': 0.4583364196533785, 'pressure': 0.4392871870570768, 'schlieren': 0.5658591156150347, 'series': 0.5135702366908754, 'several': 0.5019572429443755, 'test': 0.474704015050458, 'thickness': 0.48535007736521485, 'to': 0.40694985823016855, 'transonic': 0.5329293824819448, 'tunnel': 0.48440576630023113, 'two': 0.44947574019106973, 'wind': 0.49917217615761783, 'without': 0.5181450275443787, 'x': 0.5483665771179728}

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3 973 0.052259164359343864 interaction effects produced by jet exhausting laterally near base of ogive-cylinder model in supersonic main stream .

Vector Representation for the Rank 3 With Document ID 973

{'angle': 0.4684465348809846, 'appears': 0.5210852548720921, 'attack': 0.4913156986866975, 'base': 0.5189089459181162, 'boundary': 0.44018951096063197, 'condition': 0.45198654823179235, 'cylinder': 0.47676027023433487, 'determined': 0.4834360448448163, 'diameter': 0.5031991381411923, 'discussed': 0.46896806613993514, 'effect': 0.43857670459802084, 'exhausting': 0.5628401631314678, 'experimentally': 0.5242087982966382, 'force': 0.5258536109360863, 'forebody': 0.5854060219039989, 'found': 0.4529822451349698, 'free': 0.47131991629254794, 'independent': 0.5196198226841175, 'interaction': 0.5673190130108998, 'inversely': 0.5957332627414085, 'jet': 0.5686034365909036, 'laminar': 0.4679324721071867, 'layer': 0.4453326028123688, 'length': 0.49437995538663926, 'mach': 0.4470976775223156, 'mainstream': 0.590199545668742, 'model': 0.4754780588051052, 'near': 0.49367604844952845, 'number': 0.43282905302098323, 'ogive': 0.5708505934516364, 'presented': 0.45187760094456275, 'pressure': 0.4349374374445928, 'product': 0.5562951649992738, 'proportional': 0.5459679241618642, 'ratio':

0.4906220335821692, 'root': 0.5490914675864104, 'side': 0.5367804013853495, 'square': 0.5196198226841175, 'stagnation': 0.4870150628058053, 'stream': 0.46562629648962023, 'to': 0.4074410039701492, 'tobody': 0.6600540297733153, 'turbulent': 0.4870150628058053}

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4 708 0.04482996448732572 aerodynamic characteristics of two winged reentry vehicles at supersonic and hypersonic speeds .

Vector Representation for the Rank 4 With Document ID 708

{'angle': 0.5056163983354184, 'at': 0.4405471816879144, 'attack': 0.5409046524201863, 'center': 0.5500752282296417, 'conducted': 0.5283836467636346, 'configuration': 0.5206888805210677, 'control': 0.5449315527644021, 'data': 0.47796155541869834, 'degree': 0.5613858846512297, 'glider': 0.6344680971241227, 'hypersonic': 0.49435222744429297, 'langley': 0.5674980997784189, 'lifting': 0.5585471434161507, 'mach': 0.47267405250710354, 'number': 0.4506568571640286, 'on': 0.4230785244363468, 'performance': 0.5469133939337625, 'presented': 0.46013321611676755, 'reentry': 0.6149108706167306, 'research': 0.5394963426191804, 'stability': 0.5128330083832634, 'test': 0.47700494319862297, 'to': 0.40627756536792853, 'two': 0.4509996224506783, 'up': 0.532944370075529, 'were': 0.4649397996352611, 'winged': 0.6344680971241227}

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5 430 0.04072525799486428 calibration of the flow in the mach 4 working section of the 4ft . x 3ft . high supersonic speed wind tunnel at rae bedford .

Vector Representation for the Rank 5 With Document ID 430

{'angle': 0.48548231880139464, 'distribution': 0.4658897602523783, 'flow': 0.43250741206752935, 'ft': 0.6198152993936824, 'high': 0.4856983811405233, 'humidity': 0.675525437004926, 'mach': 0.4763251100744669, 'nozzle': 0.5283206187490602, 'number': 0.44099993639074936, 'presented': 0.4647895124319383, 'pressure': 0.44363308049027567, 'range': 0.47231609017731074, 'section': 0.5062103719378132, 'speed': 0.4802017697965108, 'supersonic': 0.4835832318906833, 'total': 0.5245599728776573, 'tunnel': 0.49374261357706395, 'wind': 0.5101424629458595, 'working': 0.5977583305124242, 'x': 0.522544674111401}

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Query No: 8

Query Vector for weight (Version 1) are:

[('angle', 0.030272560339299728),

('approximate', 0.04780324214285581),

('at', 0.030272560339299728),

('attack', 0.030272560339299728),

('available', 0.025681984642341265),

('body', 0.025681984642341265),

('dash', 0.06926355848368322),

('exact', 0.04780324214285581),

('method', 0.04780324214285581),

('predicting', 0.04780324214285581),

('presently', 0.04780324214285581),

('pressure', 0.030272560339299728)]

Query Vector for weight (Version 2) are:

[('angle', 0.03983032422644438),

('approximate', 0.0450775561886673),

('at', 0.03983032422644438),

('attack', 0.03983032422644438),

('available', 0.03845628665095213),

('body', 0.03845628665095213),

('dash', 0.052613773660894085),

('exact', 0.0450775561886673),

('method', 0.0450775561886673),

('predicting', 0.0450775561886673),

('presently', 0.0450775561886673),

('pressure', 0.03983032422644438)]

Ranks Document Number Scores Titles

1 492 0.042098608367251135 prediction of ogive-forebody pressures at angles of attack .

Vector Representation for the Rank 1 With Document ID 492

{'angle': 0.24798988319115764, 'approximate': 0.17432308885010464, 'approximation': 0.1840627411405065, 'arbitrary': 0.22541452260545322, 'at': 0.07160436566891452, 'attack': 0.3308475657709923, 'being': 0.21980459174508976, 'body': 0.12928678150606152, 'by': 0.04010904208165435, 'calculated': 0.1728098810037261, 'distribution': 0.11675254337477482, 'forebody': 0.41029581399344117, 'lower': 0.23798399737957068, 'method': 0.09016395214855977, 'not': 0.13528517773688292, 'obtaining': 0.4426294338386114, 'ogive': 0.3780852563019674, 'on': 0.044060228048051424, 'over': 0.13717671971690412, 'present': 0.14847120469611422, 'pressure': 0.12658246390336925, 'suggested': 0.2730836374538286, 'surface': 0.16194823636556005, 'utilizing': 0.35041542073362547, 'various': 0.17638660772417045, 'zero': 0.18819815110911567}

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2 1083 0.032600738261441824 an investigation of fluid flow in two dimensions .

Vector Representation for the Rank 2 With Document ID 1083

{'bearing': 0.42090368268483946, 'boundary': 0.08893771596118338, 'condition': 0.11504406871162397, 'dash': 0.41029581399344117, 'described': 0.2057734396880969, 'dimensional': 0.15146933446727653, 'example': 0.1906616356350296, 'existence': 0.35041542073362547, 'experimental': 0.12344084813192648, 'flow': 0.09430616102264545, 'fluid': 0.24634230240117314, 'give': 0.18819815110911567, 'given': 0.10235101443118594, 'illustrating': 0.41029581399344117, 'inviscid': 0.2335694722805302, 'iv': 0.4882138804505711, 'method': 0.12480289020385103, 'numerical': 0.23646742681441385, 'obtaining': 0.4426294338386114, 'on': 0.044060228048051424, 'paper': 0.15458506753150733, 'part': 0.2912970384284152, 'perfect': 0.30798736864961457, 'present': 0.14847120469611422, 'problem': 0.11976965319858021, 'several': 0.200646434387632, 'simpler': 0.35041542073362547, 'solution': 0.16457423377136887, 'steady': 0.21372417071610914, 'to': 0.009002945218177212, 'two': 0.09736562672102574, 'viscous': 0.2020778426627266, 'work': 0.22071249888383895}

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3 1306 0.027234352358252466 experiments on circular cones at yaw in supersonic flow .

Vector Representation for the Rank 3 With Document ID 1306

{'angle': 0.163564324255595, 'by': 0.04331179236839078, 'calculated': 0.1866089364588232, 'circular': 0.20724785964980616, 'coefficient': 0.1579763843732755, 'compared': 0.16998511017361387, 'cone': 0.21514991999592978, 'corresponding': 0.23079027635009564, 'discussed': 0.1648106095218505, 'fort': 0.6214421478571256, 'halstead': 0.6214421478571256, 'made': 0.118433711946317, 'measurement': 0.1921813145342394, 'merit': 0.42391612831509007, 'method': 0.14107311431436753, 'on': 0.047578484797422, 'pressure': 0.0834887895608359, 'relative': 0.3049936147025652, 'semiapex': 0.5271982855734489, 'supersonic': 0.15993055680978174, 'then': 0.2058861729589721, 'theoretical': 0.16607526820455334, 'these': 0.11096948792961203, 'tunnel': 0.17936980955453063, 'two': 0.1051403770694433, 'value': 0.12905711054059832}

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4 248 0.027058597344852386 the application of lighthill formula for numerical calculation of pressure distributions on bodies of revolution at supersonic speed and zero angle of attack .

Vector Representation for the Rank 4 With Document ID 248

{'angle': 0.163564324255595, 'applied': 0.19160750329564033, 'applying': 0.3488145151546617, 'approximation': 0.19876034961904174, 'at': 0.055861380633815266, 'attack': 0.2182139764355936, 'based': 0.24694224337658496, 'body': 0.20228581902321388, 'by': 0.04331179236839078, 'computing': 0.5220052420278656, 'could': 0.26739815197031136, 'determining': 0.29681748236510425, 'developed': 0.17887537325596373, 'digital': 0.5482700517078164, 'distribution': 0.12607535993592625, 'drag': 0.19938423935311986, 'ducted': 0.5619808910508631, 'exact': 0.22302558106185744, 'expected': 0.31893521336122166, 'expression': 0.3439125898894312, 'external': 0.25947395655495925, 'flow': 0.09012434747486854, 'from': 0.10244855848771407, 'give': 0.20322597653563415, 'given': 0.16014134268705985, 'good': 0.2000126997486968, 'integral': 0.24237429107975692, 'lighthill': 0.4157399959776291, 'linearized': 0.4192526580554092, 'mach': 0.11254769596942187, 'method': 0.09736364101196376, 'much': 0.26203487688769017, 'number': 0.07845045600431105, 'numerical': 0.1844775358789806, 'on': 0.06893790079097756, 'over': 0.14813042879608032, 'pointed': 0.32685940877657377, 'pressure': 0.0834887895608359, 'procedure': 0.23833663006222613, 'range': 0.13837168420922066, 'result': 0.066747412341137, 'revolution': 0.372356611121051, 'shown': 0.13654641406641907, 'slender': 0.2413469199941321, 'supersonic': 0.15993055680978174, 'surface': 0.12634218584411033, 'than': 0.14246493031281426, 'theory': 0.14672389148633963, 'thickness': 0.1813765551041639, 'to': 0.009721840107770649, 'various': 0.19047126866708147, 'wave': 0.16439316606881269, 'wider': 0.4157399959776291, 'zero': 0.20322597653563415}

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5 231 0.02679198081839391 practical calculation of second-order supersonic flow past non-lifting bodies of revolution .

Vector Representation for the Rank 5 With Document ID 231

{'accuracy': 0.25222024665695203, 'angle': 0.163564324255595, 'apply': 0.360269433606657, 'approximate': 0.1882429755844433, 'at': 0.055861380633815266, 'attack': 0.2182139764355936, 'basic': 0.31403190967724753, 'body': 0.20228581902321388, 'by': 0.04331179236839078, 'calculated': 0.1866089364588232, 'calculation': 0.2515585290048947, 'can': 0.13535079247784257, 'characteristic': 0.1813765551041639, 'compared': 0.16998511017361387, 'computation': 0.30080817680039457, 'computing': 0.360269433606657, 'condition': 0.1242304617275272, 'corner': 0.3891335228376759, 'described': 0.22220467087088383, 'detail': 0.3705935221220037, 'example': 0.2058861729589721, 'flow': 0.06220061601834868, 'form': 0.1579763843732755, 'function': 0.17501924270759028, 'given': 0.11052385336735143, 'increase': 0.20192618711907667, 'method': 0.09736364101196376, 'necessarily': 0.4014093514806447, 'one': 0.14442207513234676, 'order': 0.17223680008179437, 'past': 0.270211009225151, 'presented': 0.12397011415191703, 'procedure': 0.23833663006222613, 'reduced': 0.24237429107975692, 'revolution': 0.256987276348298, 'routine': 0.44305837743833826, 'sample': 0.4014093514806447, 'second': 0.2238544228750751, 'several':

0.21666826866528383, 'shown': 0.13654641406641907, 'so': 0.22989200154213685, 'solution': 0.10854665920362061, 'standard': 0.3644548715088276, 'summarized': 0.4082757719609241, 'supersonic': 0.15993055680978174, 'table': 0.3164485331545604, 'tangency': 0.5271982855734489, 'that': 0.04725898923138793, 'theory': 0.10126360623697798, 'to': 0.014086267179562515, 'understanding': 0.37839647016748407, 'use': 0.18395285864509878, 'without': 0.25106876010190277, 'zero': 0.20322597653563415}

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Rankings Doc No Score Titles

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1 492 0.04051512125078767 prediction of ogive-forebody pressures at angles of attack .

Vector Representation for the Rank 1 With Document ID 492

{'angle': 0.5184205210342274, 'approximate': 0.49084321407129006, 'approximation': 0.49591873977378437, 'arbitrary': 0.5174679720678466, 'at': 0.43594786105313904, 'attack': 0.55798685259796, 'being': 0.5145445259917428, 'body': 0.467373902369538, 'by': 0.4209016161889557, 'calculated': 0.49005465149343713, 'distribution': 0.4608420626385423, 'forebody': 0.613813274586994, 'lower': 0.5240181743112837, 'method': 0.44698622116309666, 'not': 0.4704997854437502, 'obtaining': 0.6222152411660515, 'ogive': 0.5970277150433683, 'on': 0.4229606574493451, 'over': 0.47148550543155776, 'present': 0.47737128524167577, 'pressure': 0.4604458582597847, 'suggested': 0.5423092919029, 'surface': 0.4813035999171965, 'utilizing': 0.5826084157271793, 'various': 0.49191855462458933, 'zero': 0.4980737838102857}

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2 1306 0.02235085140821223 experiments on circular cones at yaw in supersonic flow .

Vector Representation for the Rank 2 With Document ID 1306

{'angle': 0.4840870796109412, 'by': 0.4222662377602728, 'calculated': 0.49593412602375225, 'circular': 0.5065444274164468, 'coefficient': 0.48121436547915103, 'compared': 0.4873879530691996, 'cone': 0.5106068119274887, 'corresponding': 0.5186473910444916, 'discussed': 0.4847277846600313, 'fort': 0.7194783189933236, 'halstead': 0.7194783189933236, 'made': 0.4608858014140488, 'measurement': 0.49879883995805485, 'merit': 0.6179318099605305, 'method': 0.46532467308477726, 'on': 0.4244597093965124, 'pressure': 0.44292090299259124, 'relative': 0.5567947196128623, 'semiapex': 0.6710283211911958, 'supersonic': 0.4822189895253167, 'then': 0.5058443954400459, 'theoretical': 0.48537793533205026, 'these': 0.45704850497435706, 'tunnel': 0.4922125501661482, 'two': 0.45405180681789314, 'value': 0.4663472036324212}

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3 1083 0.021176058074029842 an investigation of fluid flow in two dimensions .

Vector Representation for the Rank 3 With Document ID 1083

{'bearing': 0.6037335772185539, 'boundary': 0.4430492765158033, 'condition': 0.4556857557218054, 'dash': 0.5985989606208144, 'described': 0.49960226220119114, 'dimensional': 0.4733169858554991, 'example': 0.49228756759382053, 'existence': 0.569614546309546, 'experimental': 0.45975012003789123, 'flow': 0.443371634267286, 'fluid': 0.5176623834852551, 'give': 0.4910951462976096, 'given': 0.44954182906882995, 'illustrating': 0.5985989606208144, 'inviscid': 0.513056611463277, 'iv': 0.6363143027817678, 'method': 0.4596105718916256, 'numerical': 0.5129457701109663, 'obtaining': 0.6114165276468245, 'on': 0.42132684564800105, 'paper': 0.47482512054033904, 'part': 0.5391344625328145, 'perfect': 0.5490777366281656, 'present': 0.4718657756894391, 'problem': 0.45797312043630467, 'several': 0.4971205943677825, 'simpler': 0.569614546309546, 'solution': 0.47568809290452024, 'steady': 0.503450721933135, 'to': 0.4043577718852494, 'two': 0.44712870959804385, 'viscous': 0.49781345104816377, 'work': 0.5068333416510405}

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4 248 0.020870522037726255 the application of lighthill formula for numerical calculation of pressure distributions on bodies of revolution at supersonic speed and zero angle of attack .

Vector Representation for the Rank 4 With Document ID 248

{'angle': 0.46365417801627024, 'applied': 0.47456771627640904, 'applying': 0.5357478248595173, 'approximation': 0.4773513829180498, 'at': 0.42173952225390543, 'attack': 0.4849221330194462, 'based': 0.4945441864883507, 'body': 0.4774470497075468, 'by': 0.41685561050167075, 'computing': 0.5998546715837391, 'could': 0.5040630934906188, 'determining': 0.5155121873110003, 'developed': 0.4696127649093529, 'digital': 0.6099104037683515, 'distribution': 0.4490646321644451, 'drag': 0.47759418151350314, 'ducted': 0.6187055878077284, 'exact': 0.48679466077767236, 'expected': 0.5241197243919031, 'expression': 0.531670205913749, 'external': 0.500979241630501, 'flow': 0.4345049635829656, 'from': 0.43922340498200707, 'give': 0.47908926684840386, 'given': 0.46131163611570186, 'good': 0.4778387588690988, 'integral': 0.4943245805047881, 'lighthill': 0.5617931528338047, 'linearized': 0.5605148675533811, 'mach': 0.44380008358891, 'method': 0.4378909188510023, 'much': 0.5019758726469957, 'number': 0.4305304919925726, 'numerical': 0.4717929533979157, 'on': 0.4263935309705525, 'over': 0.45764778307938137, 'pointed': 0.527203576252021, 'pressure': 0.4324912556405868, 'procedure': 0.492753247670755, 'range': 0.45384998140120747, 'result': 0.4259760292265738, 'revolution': 0.5425602699669042, 'shown': 0.45313964269424034, 'slender': 0.49392475944190806, 'supersonic': 0.4622400280730095, 'surface': 0.4491684725583464, 'than': 0.45544294623218984, 'theory': 0.45617463731317326, 'thickness': 0.4705861475546271, 'to': 0.4037834395959031, 'various': 0.474125528888397, 'wave': 0.4639767376243388, 'wider': 0.5617931528338047, 'zero': 0.47908926684840386}

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5 291 0.020560099928645426 sweepback effects in the turbulent boundary-layer shock-wave interaction .

Vector Representation for the Rank 5 With Document ID 291

{'ahead': 0.5703799144917274, 'angle': 0.4773534276876563, 'at': 0.4354648029543454, 'available': 0.5161180445549496, 'boundary': 0.44541933985849125, 'by': 0.4204831684063067, 'can': 0.4640105829070708, 'configuration': 0.517668659860385, 'dimensional': 0.4773534276876563, 'experiment': 0.49580184397612903, 'extension': 0.5385686042524664, 'influence': 0.511792941433094, 'interaction': 0.517668659860385, 'layer': 0.4512316981369061, 'moderate': 0.550831986596494, 'on': 0.42250098791417684, 'peak': 0.5703799144917274, 'pressure': 0.45300465969649684, 'reattachment': 0.5898359522115957, 'reported': 0.5572851609425697, 'rise': 0.5922869659676546, 'separation': 0.5442760084883067, 'shock': 0.47240202489658145, 'show': 0.4900783564782236, 'simple': 0.48299425281798625, 'sweep': 0.5723593068169193, 'sweptback': 0.6004799379479042, 'that': 0.4223498909235817, 'theory': 0.4478899483618625, 'turbulent': 0.4983382632910418, 'two': 0.449723364747835, 'understood': 0.628600569078889, 'upstream': 0.5485130986074713, 'wave': 0.4777454065348471}

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Query No: 9

Query Vector for weight (Version 1) are:

[('flow', 0.03289649754063496),

('heat', 0.07215220853242434),

('internal', 0.09387218755408672),

('on', 0.05043222951076198),

('paper', 0.07215220853242434),

('slip', 0.09387218755408672),

('study', 0.09387218755408672),

('transfer', 0.09387218755408672)]

Query Vector for weight (Version 2) are:

[('flow', 0.06025897240686098),

('heat', 0.07250110412252518),

('internal', 0.07927461139896373),

('on', 0.06572759684608664),

('paper', 0.07250110412252518),

('slip', 0.07927461139896373),

('study', 0.07927461139896373),

('transfer', 0.07927461139896373)]

Ranks Document Number Scores Titles

1 507 0.05897218595953786 energy equation approximations in fluid mechanics .

Vector Representation for the Rank 1 With Document ID 507

{'discussion': 0.3182369617027767, 'energy': 0.2756739005276814, 'equation': 0.13117246567543026, 'flow': 0.0751659077259313, 'fluid': 0.23224019116896719, 'form': 0.19090547796463975, 'incompressible': 0.2546790925496304, 'nearly': 0.3983901883062696, 'several': 0.26183128290606894, 'study': 0.22681852995652782, 'use': 0.22229657009763265}

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2 21 0.046718998843695056 on heat transfer in slip flow .

Vector Representation for the Rank 2 With Document ID 21

{'analysis': 0.14343792139007638, 'author': 0.23833663006222613, 'boundary': 0.13915450988636802, 'by': 0.04331179236839078, 'considered': 0.15993055680978174, 'considers': 0.36885503908586875, 'effect': 0.09218542078944494, 'eg': 0.3950520390840711, 'flat': 0.17692564250327128, 'friction': 0.2488111440108371, 'heat': 0.14608784514803438, 'impulsive': 0.5271982855734489, 'infinite': 0.26074486069362346, 'laminar': 0.23521335879664781, 'layer': 0.15696225147919476, 'motion': 0.21590573510828764, 'number': 0.07845045600431105, 'on': 0.06893790079097756, 'other': 0.1682253672297902, 'over': 0.14813042879608032, 'perturbation': 0.3524654687089807, 'plate': 0.23002160078661651, 'reference': 0.4329252952679785, 'skin': 0.23638689930953372, 'slip': 0.3835971206320758, 'studiesdash': 0.6214421478571256, 'transfer': 0.17501924270759028, 'usual': 0.31403190967724753, 'while': 0.28935325834839926}

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3 398 0.045006334037132126 heat transfer in turbulent shear flow .

Vector Representation for the Rank 3 With Document ID 398

{'along': 0.20064579827032275, 'analogy': 0.3325804923459027, 'analysis': 0.14343792139007638, 'between': 0.1415028515150645, 'discussed': 0.1648106095218505, 'extending': 0.37349316648351, 'flow': 0.06220061601834868, 'fluid': 0.1921813145342394, 'friction': 0.2488111440108371, 'from': 0.07070634769260985, 'heat': 0.2116710823907653, 'higher': 0.22302558106185744, 'karmans': 0.4545132958903335, 'known': 0.2373562255588418, 'method': 0.09736364101196376, 'number': 0.07845045600431105, 'on': 0.047578484797422, 'paper': 0.16692885196679205, 'point': 0.16998511017361387, 'prandtl': 0.2716527987994464, 'problem': 0.12933338923453824, 'shear': 0.2393283689727511, 'smooth': 0.3524654687089807, 'suggested': 0.29488966055399934, 'to': 0.009721840107770649, 'transfer': 0.2535906563998364, 'turbulent': 0.20793689516404892, 'view': 0.3488145151546617, 'von': 0.3325804923459027, 'wall': 0.18239781074082373, 'well': 0.1844775358789806}

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4 1152 0.044690681812558974 on periodically oscillating wakes in the oseen approximation .

Vector Representation for the Rank 4 With Document ID 1152

{'approximation': 0.24019058098446416, 'at': 0.06750530221317826, 'behind': 0.3150953381735983, 'by': 0.05233983836505397, 'math': 0.6370891515767835, 'mean': 0.23796112640068073, 'mechs': 0.7509775004326937, 'number': 0.09480291538170249, 'obstacle': 0.5841340850404995, 'order': 0.20813837949995173, 'oscillating': 0.40554237866270815, 'oseen': 0.5354108567977349, 'reynolds': 0.20595586430686588, 'studied': 0.3198442131627761, 'study': 0.22681852995652782, 'vortex': 0.36856744140554065, 'wake': 0.35635738732867905}

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5 326 0.03742944748273964 forst-order slip effects on the compressible laminar boundary layer over a slender body of revolution in axial flow .

Vector Representation for the Rank 5 With Document ID 326

{'analysis': 0.14343792139007638, 'boundary': 0.13915450988636802, 'case': 0.11555798590132785, 'compressible': 0.2354284037477369, 'considered': 0.15993055680978174, 'curvature':

0.29115931369431924, 'effect': 0.09218542078944494, 'examined': 0.29681748236510425, 'first': 0.1813765551041639, 'flow': 0.06220061601834868, 'gradient': 0.2189974016094449, 'interaction': 0.2488111440108371, 'layer': 0.15696225147919476, 'no': 0.20064579827032275, 'only': 0.16692885196679205, 'order': 0.17223680008179437, 'pressure': 0.0834887895608359, 'slip': 0.3835971206320758, 'transverse': 0.2858513655793169, 'zero': 0.20322597653563415}

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Rankings Doc No Score Titles

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1 398 0.03164298326482257 heat transfer in turbulent shear flow .

Vector Representation for the Rank 1 With Document ID 398

{'along': 0.4983352871591335, 'analogy': 0.5629956794524992, 'analysis': 0.4702980541381645, 'between': 0.4693496881445945, 'discussed': 0.48077267878975616, 'extending': 0.5830467325742268, 'flow': 0.4304841441503737, 'fluid': 0.4941868950870495, 'friction': 0.5219408305861197, 'from': 0.4346527515864494, 'heat': 0.4949805892091891, 'higher': 0.5093034827871309, 'karmans': 0.6227542059405831, 'known': 0.5163268446214407, 'method': 0.4477173291457176, 'number': 0.43844809203806756, 'on': 0.42331792644293303, 'paper': 0.48181081654739494, 'point': 0.48330867013312206, 'prandtl': 0.5331353868748169, 'problem': 0.4633855085891595, 'shear': 0.5172933801312674, 'smooth': 0.5727411856015063, 'suggested': 0.5445236316973302, 'to': 0.40476461479360176, 'transfer': 0.5137906495812028, 'turbulent': 0.5019086094660561, 'view': 0.5709518754377074, 'von': 0.5629956794524992, 'wall': 0.48939205929561247, 'well': 0.4904113199551215}

==========

2 507 0.026814902819351644 energy equation approximations in fluid mechanics .

Vector Representation for the Rank 2 With Document ID 507

{'discussion': 0.5474137008336801, 'energy': 0.527697642921805, 'equation': 0.46076169942432343, 'flow': 0.4348183459743789, 'fluid': 0.5075782834255236, 'form': 0.48843122076584533, 'incompressible': 0.517972429590905, 'nearly': 0.5845422722735273, 'several': 0.5212854666557016, 'study': 0.5050668619372222, 'use': 0.5029722000404572}

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3 21 0.026690851513041007 on heat transfer in slip flow .

Vector Representation for the Rank 3 With Document ID 21

{'analysis': 0.46817639773026076, 'author': 0.5132819879662347, 'boundary': 0.4611782662285065, 'by': 0.4205862017122215, 'considered': 0.47601538801328513, 'considers': 0.5753177096114058, 'effect': 0.4438159578148172, 'eg': 0.5877692083079049, 'flat': 0.48409319415039614, 'friction': 0.5182605502743822, 'heat': 0.4694359130266802, 'impulsive': 0.6505786451145108, 'infinite': 0.5239326752402296, 'laminar': 0.5034098391544277, 'layer': 0.4690073100516929, 'motion': 0.5026205282838497, 'number': 0.4372876951843522, 'on': 0.4303080457203202, 'other': 0.47995793185950913, 'over': 0.47040675807126087, 'perturbation': 0.5675277063973734, 'plate': 0.501127320578558, 'reference': 0.5903324512628949, 'skin': 0.512355276131775, 'slip': 0.5823246573217878, 'studiesdash': 0.6953729852473034, 'transfer': 0.4831870776266508, 'usual': 0.5492601410189604, 'while': 0.5375303171889951}

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4 326 0.02343285349109535 forst-order slip effects on the compressible laminar boundary layer over a slender body of revolution in axial flow .

Vector Representation for the Rank 4 With Document ID 326

{'analysis': 0.4766598175882614, 'boundary': 0.4660784246871832, 'case': 0.46175949870307836, 'compressible': 0.5258237592366958, 'considered': 0.48547423995698785, 'curvature': 0.555608918901094, 'effect': 0.4492681257057375, 'examined': 0.5586329042878203, 'first': 0.49693596710217247, 'flow': 0.4332428679364144, 'gradient': 0.5170422765262181, 'interaction': 0.5329761107031562, 'layer': 0.4745345466817294, 'no': 0.5072343362633125, 'only':

0.4892144505300779, 'order': 0.49205126195568033, 'pressure': 0.44462024628057123, 'slip': 0.6050119313641399, 'transverse': 0.5527721074754915, 'zero': 0.5086133021131177}

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5 181 0.022392017954459893 some problems on heat conduction in stratiform bodies .

Vector Representation for the Rank 5 With Document ID 181

{'applied': 0.49744353515700135, 'arising': 0.5756115083221334, 'body': 0.47100002639277916, 'calculation': 0.488294188316911, 'case': 0.45876794211171434, 'class': 0.5722539769672794, 'complicated': 0.6076319238784809, 'composite': 0.6253208973340816, 'conduction': 0.5573446936177807, 'deduction': 0.6857998970436128, 'difficulty': 0.5832179148301757, 'general': 0.4833921991644365, 'give': 0.5033522030648816, 'heat': 0.4742941473055401, 'idea': 0.592436564904029, 'infinite': 0.5326038937045354, 'lead': 0.5332599418038924, 'multilayer': 0.7160393968983785, 'on': 0.42419642068463786, 'paper': 0.4848930087578365, 'present': 0.48153547740298264, 'problem': 0.465773534147066, 'question': 0.595081397479316, 'solides': 0.7160393968983785, 'special': 0.5319575651944978, 'specific': 0.5404278885762452, 'to': 0.4064767343953059, 'usually': 0.5722539769672794}

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Query No: 10

Query Vector for weight (Version 1) are:

[('air', 0.06827068185751761),

('available', 0.03667798509873599),

('density', 0.06827068185751761),

('enthalpy', 0.06827068185751761),

('gas', 0.05247433347812679),

('over', 0.06827068185751761),

('property', 0.05247433347812679),

('range', 0.06827068185751761),

('real', 0.06827068185751761),

('transport', 0.06827068185751761),

('wide', 0.06827068185751761)]

Query Vector for weight (Version 2) are:

[('air', 0.05479005299633102),

('available', 0.04626311028551071),

('density', 0.05479005299633102),

('enthalpy', 0.05479005299633102),

('gas', 0.05052658164092087),

('over', 0.05479005299633102),

('property', 0.05052658164092087),

('range', 0.05479005299633102),

('real', 0.05479005299633102),

('transport', 0.05479005299633102),

('wide', 0.05479005299633102)]

Ranks Document Number Scores Titles

1 405 0.13086258711278625 tables of thermal properties of gases .

Vector Representation for the Rank 1 With Document ID 405

{'air': 0.17692564250327128, 'argon': 0.4329544232897724, 'carbon': 0.7003800638456551, 'dioxide': 0.5271982855734489, 'hydrogen': 0.4329544232897724, 'monoxide': 0.6214421478571256, 'nitrogen': 0.3835971206320758, 'oxygen': 0.4082757719609241, 'property': 0.2238544228750751, 'steam': 0.5619808910508631, 'table': 0.3164485331545604, 'thermodynamic': 0.3453126223855793, 'transport': 0.3562787391713667}

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2 436 0.05212248631680083 heat transfer in planetary atmospheres at super-satellite speeds .

Vector Representation for the Rank 2 With Document ID 436

{'atmosphere': 0.28085279874249974, 'atom': 0.4157399959776291, 'by': 0.04331179236839078, 'concept': 0.28935325834839926, 'dependence': 0.3835971206320758, 'discussed': 0.1648106095218505, 'enthalpy': 0.3164485331545604, 'examine': 0.44305837743833826, 'feb': 0.6214421478571256, 'flight': 0.2144007059732076, 'ftsec': 0.5619808910508631, 'heat': 0.14608784514803438, 'hirshfelder': 0.6214421478571256, 'investigation': 0.1639777441416276, 'ionized': 0.4545132958903335, 'jchemphys': 0.6214421478571256, 'large': 0.1713290195438332, 'main': 0.27924930419983346, 'on': 0.047578484797422, 'planetary': 0.4677370287671866, 'property': 0.2238544228750751, 'proportion': 0.4157399959776291, 'purpose': 0.2499325254733439, 'thermodynamic': 0.3453126223855793, 'to': 0.014086267179562515, 'total': 0.3453331275269181, 'transfer': 0.17501924270759028, 'transport': 0.3562787391713667, 'up': 0.2058861729589721, 'used': 0.1447526514964224, 'velocity': 0.12988863039831225}

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3 438 0.046051633277970315 stagnation point heat transfer measurements at super satellite speeds .

Vector Representation for the Rank 3 With Document ID 438

{'between': 0.1415028515150645, 'blunt': 0.22812318711727908, 'body': 0.13961047050608286, 'brief': 0.3296722660314134, 'by': 0.04331179236839078, 'comparison': 0.20322597653563415, 'corresponding': 0.23079027635009564, 'data': 0.1607248630432404, 'description': 0.3241358638258134, 'enthalpy': 0.3164485331545604, 'experiment': 0.20257362008142774, 'ft':

0.46965022359082137, 'heating': 0.2545706528709851, 'measurement': 0.1921813145342394, 'over': 0.14813042879608032, 'per': 0.35269004915891594, 'performed': 0.33559078227780864, 'point': 0.16998511017361387, 'provided': 0.29115931369431924, 'range': 0.13837168420922066, 'respectively': 0.3164485331545604, 'sec': 0.5344451846043565, 'shock': 0.15309455095854613, 'stagnation': 0.30128603528752607, 'technique': 0.2393283689727511, 'theory': 0.10126360623697798, 'thus': 0.2488111440108371, 'to': 0.014086267179562515, 'tube': 0.26074486069362346, 'used': 0.1447526514964224, 'using': 0.19392614336958838, 'velocity': 0.12988863039831225}

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4 524 0.03581399441281179 stagnation point heat transfer in partially ionized air .

Vector Representation for the Rank 4 With Document ID 524

{'based': 0.2184619361145119, 'by': 0.05551802306592111, 'comparison': 0.18819815110911567, 'data': 0.14883984113467844, 'ft': 0.3001671898448374, 'hansens': 0.5754887502163468, 'heat': 0.18725866358969678, 'lower': 0.23798399737957068, 'obtained': 0.0983379890438054, 'on': 0.060987164741596066, 'peng': 0.7965784284662087, 'pindroh': 0.7965784284662087, 'property': 0.28694160026627946, 'range': 0.1281395989722977, 'rate': 0.295817297321991, 'recently': 0.28863378435483206, 'reported': 0.30798736864961457, 'sec': 0.34157954394707607, 'shown': 0.12644930095033347, 'that': 0.043764358022771316, 'thermodynamic': 0.31977800375441295, 'to': 0.012461671841138389, 'transfer': 0.22434357532410434, 'transport': 0.4566860473234241, 'using': 0.17958600694669774, 'velocity': 0.12028383628788435}

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5 482 0.03168827409397153 a re-examination of the use of the simple concepts for prediction the shape and location of detached shock waves .

Vector Representation for the Rank 5 With Document ID 482

{'can': 0.13535079247784257, 'concept': 0.4192526580554092, 'detached': 0.37839647016748407, 'existing': 0.2987896257790135, 'good': 0.2000126997486968, 'ha': 0.11966097837637452, 'location': 0.270211009225151, 'mach': 0.11254769596942187, 'made': 0.118433711946317, 'method':

0.09736364101196376, 'modification': 0.3164485331545604, 'nose': 0.2393283689727511, 'number': 0.07845045600431105, 'predicting': 0.34194809467438225, 'prediction': 0.24770423239070574, 'range': 0.13837168420922066, 'reexamination': 0.5619808910508631, 'result': 0.066747412341137, 'shape': 0.2542754828725913, 'shock': 0.15309455095854613, 'show': 0.19047126866708147, 'simple': 0.2542754828725913, 'that': 0.04725898923138793, 'use': 0.18395285864509878, 'wave': 0.16439316606881269, 'wide': 0.2930042119027183, 'yield': 0.25947395655495925}

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Rankings Doc No Score Titles

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1 405 0.06273503466128244 tables of thermal properties of gases .

Vector Representation for the Rank 1 With Document ID 405

{'air': 0.5014423677946904, 'argon': 0.6482394367729205, 'carbon': 0.7477739055150967, 'dioxide': 0.7022752475514293, 'hydrogen': 0.6482394367729205, 'monoxide': 0.7563110583299382, 'nitrogen': 0.6199398552158644, 'oxygen': 0.6340896459943924, 'property': 0.5283495279512219, 'steam': 0.7222182575514198, 'table': 0.5814394342965952, 'thermodynamic': 0.5979889944078587, 'transport': 0.6042765445703107}

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2 436 0.024099036514665002 heat transfer in planetary atmospheres at super-satellite speeds .

Vector Representation for the Rank 2 With Document ID 436

{'atmosphere': 0.5348466239034382, 'atom': 0.5996103835540267, 'by': 0.4207954095605756, 'concept': 0.5389279728685024, 'dependence': 0.5841775367306953, 'discussed': 0.4791309695933122, 'enthalpy': 0.5519373014125153, 'examine': 0.6127268329074846, 'feb':

0.6983747214378525, 'flight': 0.5029407984981771, 'ftsec': 0.6698254252610631, 'heat': 0.47014155742703556, 'hirshfelder': 0.6983747214378525, 'investigation': 0.47873108365593875, 'ionized': 0.6182267142946627, 'jchemphys': 0.6983747214378525, 'large': 0.4822606716600828, 'main': 0.5340767336744845, 'on': 0.4228439882888821, 'planetary': 0.6245758613988703, 'property': 0.507479837501041, 'proportion': 0.5996103835540267, 'purpose': 0.520000788365441, 'thermodynamic': 0.5657958956735577, 'to': 0.4062349578024672, 'total': 0.5528536588492581, 'transfer': 0.4840324686203087, 'transport': 0.5710610873772375, 'up': 0.49885269242900204, 'used': 0.46950048724015003, 'velocity': 0.46236378405725836}

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3 438 0.021846049010324844 stagnation point heat transfer measurements at super satellite speeds .

Vector Representation for the Rank 3 With Document ID 438

{'between': 0.46828713683456724, 'blunt': 0.5100888012292585, 'body': 0.467373902369538, 'brief': 0.5590948514465257, 'by': 0.4209016161889557, 'comparison': 0.4980737838102857, 'corresponding': 0.5113758981707075, 'data': 0.477563388990662, 'description': 0.5564230674440334, 'enthalpy': 0.552713277882764, 'experiment': 0.4977589664481171, 'ft': 0.6085875942009225, 'heating': 0.5228519483567818, 'measurement': 0.49274379690680276, 'over': 0.47148550543155776, 'per': 0.5566416136038248, 'performed': 0.5619510379081263, 'point': 0.4820322442550126, 'provided': 0.5405090829055552, 'range': 0.4667760828312257, 'respectively': 0.552713277882764, 'sec': 0.6373652341450078, 'shock': 0.4738811157372322, 'stagnation': 0.5338113474884918, 'technique': 0.5154962525875045, 'theory': 0.44886828541918167, 'thus': 0.5200724964558358, 'to': 0.4062561890416905, 'tube': 0.5258315277074119, 'used': 0.4698554411735673, 'using': 0.4935858249235999, 'velocity': 0.4626822893128751}

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4 524 0.02165205276349171 stagnation point heat transfer in partially ionized air .

Vector Representation for the Rank 4 With Document ID 524

{'based': 0.5089335465726618, 'by': 0.4276834274145751, 'comparison': 0.4970821450287198, 'data': 0.47677913389654214, 'ft': 0.5548414502780324, 'hansens': 0.6968662655910329, 'heat': 0.4933743915031044 7, 'lower': 0.5227642078944891, 'obtained': 0.4507277189383661, 'on': 0.4304105523775587, 'peng': 0.7972047253605625, 'pindroh': 0.7972047253605625, 'property': 0.5430801481126508, 'range': 0.4661008998124426, 'rate': 0.5405412477182665, 'recently': 0.5488919351640048, 'reported': 0.5588754948656209, 'sec': 0.5762040414790652, 'shown': 0.4652289584211856, 'that': 0.42257587403285446, 'thermodynamic': 0.564957702052455, 'to': 0.4062138701781363, 'transfer': 0.5118663587144798, 'transport': 0.6277212757975111, 'using': 0.49263956456947106, 'velocity': 0.4620484992561947}

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5 302 0.017649317142796224 approximations for the thermodynamic and transport properties of high temperature air .

Vector Representation for the Rank 5 With Document ID 302

{'air': 0.5319587781447008, 'approximate': 0.46568366786324766, 'atmosphere': 0.4979980362815218, 'become': 0.5193160329479973, 'can': 0.4472279853765586, 'closed': 0.5257089022569383, 'coefficient': 0.4551227387327196, 'compared': 0.4593129463857876, 'complete': 0.494787878034048, 'component': 0.5650590057557967, 'compressibility': 0.5788040846619315, 'conductivity': 0.5229858628619014, 'degree': 0.5281166766374139, 'energy': 0.4795990799018965, 'enthalpy': 0.5622131185917647, 'entropy': 0.5378456053583616, 'equilibrium': 0.4856736661523193, 'flux': 0.5320339735915242, 'form': 0.4551227387327196, 'found': 0.4649008465324699, 'fraction': 0.5357804560258858, 'from': 0.44734974683151435, 'fully': 0.5150326250342225, 'function': 0.4610695074915323, 'heat': 0.47488536828906436, 'high': 0.4572167946757285, 'ionized': 0.5585934363500247, 'k': 0.5181863595272305, 'major': 0.5648005441574264, 'minor': 0.5378456053583616, 'mol': 0.6168399618064897, 'neglecting': 0.5510708936203168, 'number': 0.4402141005254394, 'order': 0.4600986291003791, 'over': 0.4516871870266286, 'partition': 0.6168399618064897, 'prandtl': 0.5392505985986566, 'predicted': 0.48350890676824854, 'pressure': 0.42913176391731306, 'property': 0.47810957894282535, 'range': 0.44828206587288855, 'small': 0.4538039001838814, 'sound': 0.5112861425998609, 'specific': 0.4963499433750351, 'speed': 0.45354696476182443, 'starting': 0.5357804560258858, 'tabulated': 0.582630283644582, 'temperature': 0.450049829260981, 'that': 0.4164900907595078, 'thermal': 0.485301825434144, 'thermodynamic': 0.5204900184314547, 'to': 0.4065104008743407, 'transparent': 0.5960921308148266, 'transport': 0.524316428264124, 'unity': 0.5104184646625072, 'value': 0.4450319293871152, 'viscosity': 0.4928243681638519}

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Query No: 11

Query Vector for weight (Version 1) are:

[('analytical', 0.06258145836939115),

('approximation', 0.06258145836939115),

('blast', 0.06258145836939115),

('find', 0.06258145836939115),

('newtonian', 0.06258145836939115),

('possible', 0.048101472354949555),

('problem', 0.02895997202888316),

('similar', 0.06258145836939115),

('solution', 0.048101472354949555),

('strong', 0.06258145836939115),

('to', 0.025151237511092873),

('wave', 0.048101472354949555)]

Query Vector for weight (Version 2) are:

[('analytical', 0.04949928469241774),

('approximation', 0.04949928469241774),

('blast', 0.04949928469241774),

('find', 0.04949928469241774),

('newtonian', 0.04949928469241774),

('possible', 0.04575883575292521),

('problem', 0.0408142312123184),

('similar', 0.04949928469241774),

('solution', 0.04575883575292521),

('strong', 0.04949928469241774),

('to', 0.03983036444796734),

('wave', 0.04575883575292521)]

Ranks Document Number Scores Titles

1 320 0.06444618379776781 comment on improved numerical solution of the blasius problem with three-point boundary conditions .

Vector Representation for the Rank 1 With Document ID 320

{'accurate': 0.270211009225151, 'attention': 0.31403190967724753, 'drawn': 0.3891335228376759, 'previous': 0.2841526078838075, 'problem': 0.12933338923453824, 'solution': 0.10854665920362061, 'to': 0.014086267179562515}

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2 495 0.0530542646470208 on similar solutions for strong blast waves and their application to steady hypersonic flow .

Vector Representation for the Rank 2 With Document ID 495

{'application': 0.2058861729589721, 'applied': 0.19160750329564033, 'approximation': 0.28798986183687697, 'blast': 0.5638272909708307, 'body': 0.13961047050608286, 'busemann': 0.4677370287671866, 'case': 0.11555798590132785, 'constitutes': 0.5271982855734489, 'density': 0.24237429107975692, 'equivalence': 0.44305837743833826, 'expression': 0.2373562255588418, 'flow': 0.06220061601834868, 'formula': 0.33053456217808586, 'found': 0.18344881980918248, 'general': 0.1639777441416276, 'higher': 0.22302558106185744, 'hypersonic': 0.19451572961012958,

'ie': 0.3488145151546617, 'improvement': 0.3835971206320758, 'investigated': 0.20863150997394708, 'law': 0.28085279874249974, 'layer': 0.10832975779775116, 'neglecting': 0.4329544232897724, 'newton': 0.5271982855734489, 'newtonian': 0.2987896257790135, 'obtained': 0.10619038357284823, 'order': 0.24955909140758387, 'power': 0.24237429107975692, 'pressure': 0.1209694238143449, 'principle': 0.33559078227780864, 'profile': 0.22139154193623733, 'result': 0.066747412341137, 'shock': 0.15309455095854613, 'shown': 0.13654641406641907, 'simple': 0.2542754828725913, 'solution': 0.10854665920362061, 'strong': 0.4450613362496161, 'temperature': 0.14343792139007638, 'term': 0.1871501651331313, 'thin': 0.21219154199318402, 'to': 0.009721840107770649, 'upon': 0.2545706528709851, 'using': 0.19392614336958838, 'velocity': 0.12988863039831225, 'wave': 0.2381942136539113}

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3 1152 0.04741412439443163 on periodically oscillating wakes in the oseen approximation .

Vector Representation for the Rank 3 With Document ID 1152

{'approximation': 0.24019058098446416, 'at': 0.06750530221317826, 'behind': 0.3150953381735983, 'by': 0.05233983836505397, 'math': 0.6370891515767835, 'mean': 0.23796112640068073, 'mechs': 0.7509775004326937, 'number': 0.09480291538170249, 'obstacle': 0.5841340850404995, 'order': 0.20813837949995173, 'oscillating': 0.40554237866270815, 'oseen': 0.5354108567977349, 'reynolds': 0.20595586430686588, 'studied': 0.3198442131627761, 'study': 0.22681852995652782, 'vortex': 0.36856744140554065, 'wake': 0.35635738732867905}

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4 670 0.046421906928877404 on blunt-body heat transfer at hypersonic speed and low reynolds number .

Vector Representation for the Rank 4 With Document ID 670

{'analytical': 0.3198442131627761, 'arising': 0.4172906696483052, 'between': 0.17099815019195158, 'comparison': 0.24558703719724512, 'data': 0.19422685815856466, 'difference': 0.31204612886278377, 'discussion': 0.3182369617027767, 'due': 0.24094451625367497, 'experimental': 0.16108273106391074, 'inconsistency': 0.7509775004326937, 'introduced':

0.3635095776851176, 'made': 0.14312040673633072, 'particular': 0.26753909008830196, 'presentation': 0.5122785371621799, 'result': 0.08066045255080079, 'those': 0.23796112640068073, 'to': 0.011748290985597008, 'way': 0.37948970696423406}

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5 920 0.039511770328693026 supersonic flow over an inclined wing of zero aspect ratio .

Vector Representation for the Rank 5 With Document ID 920

{'approximation': 0.24019058098446416, 'asymptotic': 0.37948970696423406, 'at': 0.06750530221317826, 'distribution': 0.152354903827028, 'expression': 0.2868315024929699, 'found': 0.15300079777058181, 'incidence': 0.3355547307357344, 'laminar': 0.19617368800528992, 'lift': 0.24798866528445648, 'linearized': 0.3496669600635051, 'long': 0.3318519927509069, 'narrow': 0.5492534744193474, 'on': 0.05749589356104888, 'potential': 0.3318519927509069, 'stream': 0.18951397193648478, 'supersonic': 0.19326698423974895, 'theory': 0.12237131028024509, 'used': 0.17492534868552315, 'wing': 0.19279035975607345}

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Rankings Doc No Score Titles

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1 320 0.06634672768267554 comment on improved numerical solution of the blasius problem with three-point boundary conditions .

Vector Representation for the Rank 1 With Document ID 320

{'accurate': 0.5618011772797783, 'attention': 0.5880409419101723, 'drawn': 0.6330114612824701, 'previous': 0.5701493459299061, 'problem': 0.47744427105224063, 'solution': 0.4649972675032589, 'to': 0.4071860442032682}

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2 495 0.02716630131323467 on similar solutions for strong blast waves and their application to steady hypersonic flow .

Vector Representation for the Rank 2 With Document ID 495

{'application': 0.4828544834949395, 'applied': 0.47710833851129375, 'approximation': 0.5129111734854573, 'blast': 0.621057785369898, 'body': 0.4561832456158776, 'busemann': 0.5882307557277564, 'case': 0.4465038380089661, 'constitutes': 0.6121596658135473, 'density': 0.4975383456365823, 'equivalence': 0.5782993607252815, 'expression': 0.4955189325749677, 'flow': 0.42503130656712107, 'formula': 0.5295915246980775, 'found': 0.47192413436730457, 'general': 0.46598933333044806, 'higher': 0.48975187143199406, 'hypersonic': 0.4782786919435343, 'ie': 0.5403729355561747, 'improvement': 0.5543704506394906, 'investigated': 0.48395928561509266, 'law': 0.513023197446849, 'layer': 0.443594992322545, 'neglecting': 0.5742332406444406, 'newton': 0.6121596658135473, 'newtonian': 0.5202414895656916, 'obtained': 0.44273404695715596, 'order': 0.4978437563220729, 'power': 0.4975383456365823, 'pressure': 0.4474280570559596, 'principle': 0.5350513273022536, 'profile': 0.48909428736105814, 'result': 0.4268610674270521, 'shock': 0.46160962517909226, 'shown': 0.45495018168516727, 'simple': 0.49969289535611433, 'solution': 0.4436822796507534, 'strong': 0.5744936347009806, 'temperature': 0.45772352130092187, 'term': 0.4753145781731939, 'thin': 0.4853919443018812, 'to': 0.4039123464639378, 'upon': 0.502446510387068, 'using': 0.47804142558060325, 'velocity': 0.4522708991519398, 'wave': 0.49338796862350176}

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3 264 0.02657370342283728 asymptotic solution of the two dimensional oscillating aerofoil problem for high subsonic mach numbers .

Vector Representation for the Rank 3 With Document ID 264

{'asymptotic': 0.5597034505681145, 'boundary': 0.44884165346989835, 'burger': 0.7743942428825275, 'by': 0.422026559971663, 'equation': 0.4552022755912801, 'given': 0.473631497192996, 'ha': 0.46085455189794094, 'identical': 0.595081397479316, 'lead': 0.5332599418038924, 'method': 0.47233880801510275, 'new': 0.5276830350117669, 'obtaining':

0.5756115083221334, 'previously': 0.5404278885762452, 'problem': 0.465773534147066, 'result': 0.44446743173259623, 'simpler': 0.592436564904029, 'solution': 0.4552022755912801, 'than': 0.47245168485994427, 'to': 0.4049441198911225, 'value': 0.4656330303976668, 'wave': 0.4836034653229657}

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4 670 0.020116353548652197 on blunt-body heat transfer at hypersonic speed and low reynolds number .

Vector Representation for the Rank 4 With Document ID 670

{'analytical': 0.5422588997028789, 'arising': 0.585600705210302, 'between': 0.47605580372077766, 'comparison': 0.509231120199101, 'data': 0.4863873660903871, 'difference': 0.538790502131019, 'discussion': 0.5415440334810254, 'due': 0.507166240191584, 'experimental': 0.47164566729436025, 'inconsistency': 0.7340164633799497, 'introduced': 0.561680188119037, 'made': 0.4636564638328384, 'particular': 0.5189948575499214, 'presentation': 0.6278489903489475, 'result': 0.43587580064665254, 'those': 0.5058393011993949, 'to': 0.40522535309447577, 'way': 0.5687877596016573}

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5 570 0.020073519664242458 on the boundary layer equations in hypersonic flow and their approximate solutions .

Vector Representation for the Rank 5 With Document ID 570

{'also': 0.4550861898520269, 'analytical': 0.5122493601370598, 'at': 0.43292108857340844, 'begin': 0.5983687924684361, 'between': 0.46001181873470043, 'boundary': 0.44073065889516255, 'coefficient': 0.49310107418489363, 'conventional': 0.5321851375327376, 'downstream': 0.5100437473904474, 'equation': 0.44603499057891066, 'first': 0.4769223858819318, 'flat': 0.47503473939743446, 'friction': 0.5055216139722963, 'heat': 0.46195632942021303, 'hypersonic': 0.4824947524479276, 'increase': 0.5367634212814248, 'interaction': 0.546633212732902, 'layer': 0.46384256012170233, 'leadingedge': 0.6131202083775986, 'local': 0.5272408907255706, 'mach': 0.46632834036148885, 'number': 0.44623363012941364, 'obtained': 0.445035686433949, 'over':

0.5003278699364027, 'plate': 0.49355859602623164, 'practically': 0.5675428523626828, 'prandtl': 0.5152088339265083, 'problem': 0.4548507102718087, 'rapidly': 0.5331819524390042, 'region': 0.4762822262314636, 'remains': 0.5564326196115237, 'shock': 0.4649278961026204, 'skin': 0.5002524514575691, 'solution': 0.44603499057891066, 'spread': 0.5675428523626828, 'strong': 0.5302698812206028, 'then': 0.4873169943877748, 'to': 0.40412306395290676, 'transfer': 0.4742262290547146, 'unaffected': 0.5927605644228174, 'value': 0.45473353958073454, 'velocity': 0.4550861898520269, 'viscous': 0.49254525586600556}

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Query No: 12

Query Vector for weight (Version 1) are:

[('aerodynamic', 0.06413529647326607),

('calculated', 0.06413529647326607),

('can', 0.044828648454010654),

('channel', 0.08344194449252153),

('effect', 0.06413529647326607),

('flow', 0.029241331147231073),

('ground', 0.08344194449252153),

('machine', 0.08344194449252153),

('performance', 0.08344194449252153)]

Query Vector for weight (Version 2) are:

[('aerodynamic', 0.06346015586490361),

('calculated', 0.06346015586490361),

('can', 0.05773585633845527),

('channel', 0.06918445539135194),

('effect', 0.06346015586490361),

('flow', 0.05311431494044519),

('ground', 0.06918445539135194),

('machine', 0.06918445539135194),

('performance', 0.06918445539135194)]

Ranks Document Number Scores Titles

1 650 0.0714873905475231 some design problems of hovercraft .

Vector Representation for the Rank 1 With Document ID 650

{'aerodynamic': 0.19814096454326377, 'analysis': 0.14343792139007638, 'angle': 0.163564324255595, 'considered': 0.15993055680978174, 'cushion': 0.5271982855734489, 'drag': 0.19938423935311986, 'dynamic': 0.2660255713229804, 'each': 0.22900303544888745, 'economics': 0.6214421478571256, 'effect': 0.13357023494580939, 'examined': 0.29681748236510425, 'ground': 0.32685940877657377, 'influence': 0.23638689930953372, 'jet': 0.335714298746996, 'lift': 0.20521335021328854, 'machine': 0.37839647016748407, 'on': 0.047578484797422, 'operation': 0.3453126223855793, 'optimum': 0.3387105610060959, 'over': 0.14813042879608032, 'parameter': 0.18879464604080065, 'performance': 0.3028753722576236, 'peripheral': 0.5271982855734489, 'power': 0.24237429107975692, 'pressure': 0.0834887895608359, 'ratio': 0.195256628072377, 'related': 0.3071654891969682, 'requirement': 0.3296722660314134, 'simple': 0.17549188555788003, 'stability': 0.23261554649289723, 'structural': 0.3241358638258134, 'system': 0.24341411545136124, 'then': 0.2058861729589721, 'thickness': 0.1813765551041639, 'to': 0.009721840107770649, 'various': 0.19047126866708147, 'wave': 0.16439316606881269, 'weight': 0.3241358638258134}

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2 592 0.027892330193385172 design of axial compressors .

Vector Representation for the Rank 2 With Document ID 592

{'advocated': 0.5619808910508631, 'aerodynamic': 0.19814096454326377, 'air': 0.17692564250327128, 'also': 0.12988863039831225, 'axial': 0.22725227141027599, 'bending': 0.2731192355396403, 'blade': 0.46965022359082137, 'coefficient': 0.1579763843732755, 'compressor': 0.3644548715088276, 'considered': 0.15993055680978174, 'construction': 0.3950520390840711, 'curve': 0.23261554649289723, 'described': 0.22220467087088383, 'design': 0.21292162691329164, 'different': 0.3207808785619178, 'due': 0.19938423935311986, 'efficiency': 0.3950520390840711, 'estimate': 0.2841526078838075, 'flow': 0.09012434747486854, 'form': 0.1579763843732755, 'generalized': 0.31403190967724753, 'loading': 0.2335429550964559, 'main': 0.27924930419983346, 'make': 0.3214961336939525, 'mass': 0.2582216064253042, 'material': 0.26203487688769017, 'method': 0.09736364101196376, 'outlet': 0.4833773851213525, 'performance': 0.3028753722576236, 'power': 0.24237429107975692, 'pressure': 0.0834887895608359, 'ratio': 0.13475917316521085, 'rise': 0.3028753722576236, 'rotational': 0.37839647016748407, 'speed': 0.1534603701070292, 'stage': 0.34194809467438225, 'stress': 0.19160750329564033, 'temperature': 0.14343792139007638, 'to': 0.014086267179562515, 'type': 0.17789496875257943, 'use': 0.18395285864509878, 'variable': 0.24237429107975692, 'weight': 0.3241358638258134}

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3 506 0.027305163651264504 a note on havelock's shallow-water wave-resistance curves .

Vector Representation for the Rank 3 With Document ID 506

{'acting': 0.35041542073362547, 'additional': 0.2930483094538725, 'analysis': 0.13283120624992406, 'attention': 0.29081038653619173, 'below': 0.24762502642954715, 'between': 0.13103922778854696, 'by': 0.04010904208165435, 'can': 0.1253420912509042, 'component': 0.2515650575245636, 'computer': 0.302689338503849, 'contact': 0.38499752796799536, 'continuous': 0.3107750585362357, 'currently': 0.3780852563019674, 'cushion': 0.4882138804505711, 'differ': 0.3658393706105376, 'digital': 0.35041542073362547, 'due': 0.1846404964868014, 'effect': 0.08536864256989969, 'equation': 0.10052002661977971, 'estimate': 0.26314055096784983, 'focused': 0.5754887502163468, 'from': 0.0654778691891005, 'generated': 0.3136641409190199, 'gravity': 0.3780852563019674, 'ground': 0.302689338503849, 'h': 0.34587469861049364, 'havelock': 0.7965784284662087, 'however': 0.2020778426627266, 'ibm': 0.41029581399344117, 'improved': 0.3603585072196042, 'land': 0.5754887502163468, 'machine': 0.35041542073362547, 'made': 0.10967596759648604, 'mean': 0.18235426647735564, 'motion': 0.19994028742732853, 'no': 0.1858087676880529, 'note': 0.23145091979847232, 'on': 0.060987164741596066, 'operates': 0.5754887502163468, 'original': 0.326401922980584, 'over': 0.22458960963145036, 'performance': 0.28047883467975504, 'physical': 0.26314055096784983, 'present': 0.14847120469611422, 'pressure': 0.07731509574482126, 'purpose': 0.23145091979847232, 'quest': 0.5754887502163468, 'resistance': 0.326401922980584, 'result':

0.08555832431100736, 'should': 0.258599828844718, 'shown': 0.12644930095033347, 'similar': 0.20502043869519987, 'solution': 0.10052002661977971, 'supporting': 0.4009390106847955, 'surface': 0.116999638472775, 'system': 0.22541452260545322, 't': 0.326401922980584, 'terrain': 0.5204244381420449, 'these': 0.10276369593045806, 'to': 0.014739876826450955, 'transportation': 0.5754887502163468, 'using': 0.17958600694669774, 'vehicle': 0.2515650575245636, 'water': 0.5989625761776486, 'wave': 0.15223688642824418}

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4 339 0.02620065332060848 experimental evaluation of heat transfer with transpiration cooling in a turbulent boundary layer at m=3 .2.

Vector Representation for the Rank 4 With Document ID 339

{'accelerator': 0.5619808910508631, 'analytic': 0.3488145151546617, 'boundary': 0.09603948854195138, 'by': 0.04331179236839078, 'calculated': 0.1866089364588232, 'can': 0.13535079247784257, 'conductivity': 0.3524654687089807, 'current': 0.360269433606657, 'electrical': 0.3835971206320758, 'field': 0.26577924259061636, 'found': 0.12660984428377786, 'integration': 0.2875844439235415, 'investigation': 0.1639777441416276, 'layer': 0.10832975779775116, 'physically': 0.4014093514806447, 'prescribed': 0.3488145151546617, 'reasonable': 0.3164485331545604, 'related': 0.3071654891969682, 'that': 0.04725898923138793, 'to': 0.009721840107770649, 'velocity': 0.12988863039831225, 'work': 0.23833663006222613}

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5 925 0.02421835342999025 factors affecting loads at hypersonic speeds .

Vector Representation for the Rank 5 With Document ID 925

{'aerodynamic': 0.19814096454326377, 'aircraft': 0.2660255713229804, 'at': 0.055861380633815266, 'blunt': 0.22812318711727908, 'both': 0.16866193031101664, 'boundary': 0.09603948854195138, 'brief': 0.3296722660314134, 'can': 0.13535079247784257, 'characteristic': 0.1813765551041639, 'component': 0.2716527987994464, 'configuration': 0.2488111440108371, 'current': 0.360269433606657, 'deal': 0.3453126223855793, 'designer': 0.44305837743833826, 'discussed': 0.1648106095218505, 'effect': 0.09218542078944494, 'employ': 0.44305837743833826, 'estimating':

0.360269433606657, 'give': 0.20322597653563415, 'hypersonic': 0.19451572961012958, 'information': 0.29681748236510425, 'interference': 0.29681748236510425, 'layer': 0.10832975779775116, 'load': 0.31173720439012015, 'method': 0.09736364101196376, 'on': 0.047578484797422, 'paper': 0.24186824538519194, 'several': 0.21666826866528383, 'slender': 0.2413469199941321, 'speed': 0.1534603701070292, 'summary': 0.3891335228376759, 'touch': 0.5619808910508631, 'upon': 0.2545706528709851, 'various': 0.19047126866708147}

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Rankings Doc No Score Titles

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1 650 0.03490501223607921 some design problems of hovercraft .

Vector Representation for the Rank 1 With Document ID 650

{'aerodynamic': 0.4923193697861977, 'analysis': 0.4668317050777384, 'angle': 0.47620915427352095, 'considered': 0.4745160812569422, 'cushion': 0.6456363003415054, 'drag': 0.4928986459958475, 'dynamic': 0.5239486905101255, 'each': 0.5066988644195854, 'economics': 0.6895471291411022, 'effect': 0.4579419469798412, 'examined': 0.5382954957175909, 'ground': 0.5522928622887253, 'influence': 0.510139211345186, 'jet': 0.545630799453672, 'lift': 0.4956145903855658, 'machine': 0.5763054083021599, 'on': 0.4221681354080676, 'operation': 0.5608907262127273, 'optimum': 0.5578146427423119, 'over': 0.46901807440039683, 'parameter': 0.48796466082453793, 'performance': 0.5411180346024739, 'peripheral': 0.6456363003415054, 'power': 0.5129289031999936, 'pressure': 0.4388997421822175, 'ratio': 0.48470112518572905, 'related': 0.5431169190485163, 'requirement': 0.5536034504836699, 'simple': 0.4817665358329145, 'stability': 0.5083820334891286, 'structural': 0.5510238871728619, 'system': 0.5134133862088258, 'then': 0.495928077160007, 'thickness': 0.4845083665551241, 'to': 0.4045296748907044, 'various': 0.48874584579849983, 'wave': 0.4765953346579007, 'weight': 0.5510238871728619}

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2 339 0.017838785384061973 experimental evaluation of heat transfer with transpiration cooling in a turbulent boundary layer at m=3 .2.

Vector Representation for the Rank 2 With Document ID 339

{'accelerator': 0.6937035928081268, 'analytic': 0.5822981492003731, 'boundary': 0.45019235224080445, 'by': 0.422635696750772, 'calculated': 0.49752594075854323, 'can': 0.470737305615204, 'conductivity': 0.5842062179499601, 'current': 0.5882847419088619, 'electrical': 0.600476305003574, 'field': 0.5243954348323326, 'found': 0.466169093546025, 'integration': 0.5502979652175162, 'investigation': 0.4856983811405233, 'layer': 0.4566155176802161, 'physically': 0.6097853692074651, 'prescribed': 0.5822981492003731, 'reasonable': 0.5653829740590666, 'related': 0.5605314508027468, 'that': 0.42469858877903194, 'to': 0.40508084779007186, 'velocity': 0.46788265939358864, 'work': 0.5245599728776573}

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3 203 0.017075146578909736 calculated velocity distributions and force derivatives for a series of high-speed aerofoils .

Vector Representation for the Rank 3 With Document ID 203

{'aerodynamic': 0.4941768890293862, 'aerofoil': 0.5609899648489256, 'agreement': 0.4834117259388505, 'also': 0.46173638631162445, 'at': 0.44013609511357404, 'being': 0.5128159992882652, 'calculate': 0.5693401632510229, 'calculated': 0.48869568764482857, 'centre': 0.594054481151753, 'comparison': 0.49659380776813594, 'considered': 0.47601538801328513, 'distribution': 0.45992392945797494, 'experimental': 0.4633567412055911, 'flow': 0.42956410616967816, 'good': 0.49506652938790974, 'incidence': 0.5768823387362422, 'lift': 0.5307232802214298, 'low': 0.49628374113685136, 'made': 0.4562918353255073, 'method': 0.4462771786551921, 'number': 0.4372876951843522, 'only': 0.4793416949580196, 'over': 0.47040675807126087, 'polygon': 0.6388488212845457, 'result': 0.4317252096735271, 'show': 0.4905314636672691, 'slope': 0.5470556276300269, 'subcritical': 0.6388488212845457, 'these': 0.4527440712448585, 'to': 0.40462081457563026, 'twodimensional': 0.5823246573217878, 'used': 0.46880129219170824, 'velocity': 0.46173638631162445, 'wood': 0.6505786451145108, 'zero': 0.5294573001772529}

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4 506 0.016833098415046696 a note on havelock's shallow-water wave-resistance curves .

Vector Representation for the Rank 4 With Document ID 506

{'acting': 0.5381560714943223, 'additional': 0.5155383033869846, 'analysis': 0.4523705195077352, 'attention': 0.5146559716734813, 'below': 0.4976295528991288, 'between': 0.4516640074943427, 'by': 0.4158135383248848, 'can': 0.4494178335070232, 'component': 0.4991829640375808, 'computer': 0.5193394109293377, 'contact': 0.5517905401757899, 'continuous': 0.522527316622925, 'currently': 0.5490652825473424, 'cushion': 0.5924849986077602, 'differ': 0.5442371746531338, 'digital': 0.5381560714943223, 'due': 0.4727970406666805, 'effect': 0.4336577547345608, 'equation': 0.4396313950887745, 'estimate': 0.5037467606204611, 'focused': 0.6268943094816213, 'from': 0.42581554532630533, 'generated': 0.5236663768600379, 'gravity': 0.5490652825473424, 'ground': 0.5193394109293377, 'h': 0.5363658297036902, 'havelock': 0.7292720342320813, 'however': 0.47967195284922304, 'ibm': 0.5617647353909947, 'improved': 0.5420762693114022, 'land': 0.6268943094816213, 'machine': 0.5381560714943223, 'made': 0.4432412500247455, 'mean': 0.47189566322165777, 'motion': 0.4788291924669703, 'no': 0.47325764756367994, 'note': 0.4912526901817251, 'on': 0.425209530008462, 'operates': 0.6268943094816213, 'original': 0.5286884216247696, 'over': 0.4923817490124351, 'performance': 0.5105826160719018, 'physical': 0.5037467606204611, 'present': 0.45853680276941133, 'pressure': 0.4304825337679179, 'purpose': 0.4912526901817251, 'quest': 0.6268943094816213, 'resistance': 0.5286884216247696, 'result': 0.4353662144047987, 'should': 0.5019565188298291, 'shown': 0.44985436607192375, 'similar': 0.4808321115745159, 'solution': 0.4396313950887745, 'supporting': 0.558075687733899, 'surface': 0.4461287074176512, 'system': 0.4888727580416929, 't': 0.5286884216247696, 'terrain': 0.6051844514514124, 'these': 0.4405159923962981, 'to': 0.40606303917483066, 'transportation': 0.6268943094816213, 'using': 0.47080423904622704, 'vehicle': 0.4991829640375808, 'water': 0.6463747564773205, 'wave': 0.46002147428734796}

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5 925 0.016830164592192477 factors affecting loads at hypersonic speeds .

Vector Representation for the Rank 5 With Document ID 925

{'aerodynamic': 0.4937055365986116, 'aircraft': 0.5258097686525044, 'at': 0.42641816476212824, 'blunt': 0.5078848369830289, 'both': 0.47976420585204405, 'boundary': 0.44541933985849125, 'brief': 0.5559097921086812, 'can': 0.4640105829070708, 'characteristic': 0.4857772518753045, 'component': 0.5284710172815307, 'configuration': 0.517668659860385, 'current': 0.5703799144917274, 'deal': 0.563306485609891, 'designer': 0.6095327591549323, 'discussed': 0.4779428253919555, 'effect':

0.4435966602946338, 'employ': 0.6095327591549323, 'estimating': 0.5703799144917274, 'give': 0.496110358733468, 'hypersonic': 0.49199107747357185, 'information': 0.540371989815352, 'interference': 0.540371989815352, 'layer': 0.4512316981369061, 'load': 0.536592569530584, 'method': 0.4460455628004604, 'on': 0.42250098791417684, 'paper': 0.5059783839072121, 'several': 0.502467535807011, 'slender': 0.5141386522297577, 'speed': 0.472575029402165, 'summary': 0.584030423239666, 'touch': 0.665774021416902, 'upon': 0.5203924674764865, 'various': 0.4900783564782236}

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Query No: 13

Query Vector for weight (Version 1) are:

[('aileron', 0.15019550008653876),

('basic', 0.11544353365187894),

('buzz', 0.15019550008653876),

('mechanism', 0.15019550008653876),

('transonic', 0.15019550008653876)]

Query Vector for weight (Version 2) are:

[('aileron', 0.1354601226993865),

('basic', 0.12262785860758145),

('buzz', 0.1354601226993865),

('mechanism', 0.1354601226993865),

('transonic', 0.1354601226993865)]

Ranks Document Number Scores Titles

1 879 0.03662881113571643 flutter model testing at transonic speeds .

Vector Representation for the Rank 1 With Document ID 879

{'construction': 0.3950520390840711, 'delta': 0.32685940877657377, 'developed': 0.17887537325596373, 'facility': 0.3950520390840711, 'flutter': 0.27924930419983346, 'foot': 0.32685940877657377, 'model': 0.26133963885470796, 'on': 0.047578484797422, 'plane': 0.23079027635009564, 'reflection': 0.36885503908586875, 'research': 0.2875844439235415, 'straight': 0.3387105610060959, 'swept': 0.3387105610060959, 'technique': 0.2393283689727511, 'test': 0.15875271962933116, 'testing': 0.33559078227780864, 'transonic': 0.2824868378681199, 'wing': 0.15953614480318243, 'x': 0.23448049951385272}

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2 880 0.027607249406832558 the design and testing of supersonic flutter models .

Vector Representation for the Rank 2 With Document ID 880

{'airplane': 0.3296722660314134, 'basic': 0.31403190967724753, 'become': 0.34194809467438225, 'check': 0.37839647016748407, 'compared': 0.24629655002647194, 'edge': 0.17454918969413313, 'elsewhere': 0.4677370287671866, 'flutter': 0.27924930419983346, 'full': 0.3296722660314134, 'given': 0.11052385336735143, 'ii': 0.4677370287671866, 'included': 0.23448049951385272, 'leading': 0.2144007059732076, 'low': 0.20257362008142774, 'mach': 0.11254769596942187, 'number': 0.07845045600431105, 'on': 0.047578484797422, 'parameter': 0.18879464604080065, 'problem': 0.12933338923453824, 'range': 0.13837168420922066, 'result': 0.09671233772196752, 'reviewed': 0.3562787391713667, 'scale': 0.29488966055399934, 'scaled': 0.6214421478571256, 'serve': 0.4545132958903335, 'simulate': 0.4082757719609241, 'speed': 0.1534603701070292, 'supersonic': 0.15993055680978174, 'table': 0.3164485331545604, 'testing': 0.33559078227780864, 'these': 0.11096948792961203, 'those': 0.19691545141064268, 'transonic': 0.2824868378681199, 'velocity': 0.12988863039831225}

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3 38 0.021748629596994237 on the prediction of mixed subsonic/supersonic pressure distributions .

Vector Representation for the Rank 3 With Document ID 38

{'also': 0.12028383628788435, 'analyzed': 0.26631861515333216, 'by': 0.05551802306592111, 'can': 0.1253420912509042, 'considered': 0.1481042709723417, 'derive': 0.3780852563019674, 'distribution': 0.11675254337477482, 'empirical': 0.5042456405079841, 'flow': 0.07973013920664691, 'high': 0.15185218344903273, 'improved': 0.3603585072196042, 'introducing': 0.38499752796799536, 'linked': 0.5204244381420449, 'mechanism': 0.30798736864961457, 'part': 0.21044778843644407, 'physical': 0.26314055096784983, 'prediction': 0.22938740092440651, 'pressure': 0.10701779564234 96, 'relation': 0.36747849756945095, 'result': 0.08555832431100736, 'rise': 0.28047883467975504, 'scheme': 0.4009390106847955, 'semiempirical': 0.3780852563019674, 'separately': 0.37172658276448406, 'shock': 0.19624001563108695, 'shown': 0.12644930095033347, 'significance': 0.32302094422766553, 'solution': 0.10052002661977971, 'speed': 0.14211253115863087, 'subsonic': 0.21206908981096217, 'supersonic': 0.1481042709723417, 'that': 0.043764358022771316, 'then': 0.1906616356350296, 'theoretical': 0.1537946031990999, 'to': 0.012461671841138389, 'transonic': 0.3620979396832128, 'treated': 0.24635394315328818, 'tunnel': 0.1661060613333444, 'wind': 0.1951655709966986}

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4 496 0.02097454701031569 a theory of transonic aileron buzz, neglecting viscous effects .

Vector Representation for the Rank 4 With Document ID 496

{'agreement': 0.1625148957808278, 'aileron': 0.554970652201324, 'airfoil': 0.3409975204723399, 'analysis': 0.18386193211606205, 'approximation': 0.1840627411405065, 'around': 0.2730836374538286, 'boundary': 0.08893771596118338, 'buzz': 0.5754887502163468, 'by': 0.04010904208165435, 'comparison': 0.18819815110911567, 'developed': 0.1656481868095371, 'distribution': 0.11675254337477482, 'due': 0.1846404964868014, 'effect': 0.08536864256989969, 'experimental': 0.12344084813192648, 'first': 0.16796441531262127, 'flow': 0.05760110558725104, 'flutter': 0.258599828844718, 'from': 0.0654778691891005, 'harmonic': 0.39256906491107807, 'hinge': 0.4331495683762693, 'linearized': 0.2679566321533636, 'local': 0.19994028742732853, 'moment': 0.21541446873807338, 'neglected': 0.302689338503849, 'nonsteady': 0.4331495683762693, 'numerical': 0.17083608978255838, 'observation': 0.302689338503849, 'obtained': 0.13611720601244287, 'oscillation': 0.2953511086593236, 'perturbation': 0.45179811205427917,

'present': 0.14847120469611422, 'presented': 0.11480297289695095, 'pressure': 0.07731509574482126, 'region': 0.16656659021704162, 'result': 0.10119983722076477, 'satisfactory': 0.26631861515333216, 'series': 0.22350018877046007, 'shock': 0.14177376301216435, 'show': 0.17638660772417045, 'solution': 0.13913753275639817, 'sponsored': 0.4882138804505711, 'stability': 0.21541446873807338, 'supersonic': 0.1481042709723417, 'terminated': 0.4653601260677431, 'theoretical': 0.1537946031990999, 'theory': 0.09377552906037659, 'to': 0.012461671841138389, 'transonic': 0.3620979396832128, 'twodimensional': 0.35523150191913927, 'unsteady': 0.2930483094538725, 'usaf': 0.4882138804505711, 'vicinity': 0.326401922980584, 'viscous': 0.2020778426627266, 'wave': 0.15223688642824418}

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5 258 0.01836205231766431 the effect of turbulence on slider bearing lubrication .

Vector Representation for the Rank 5 With Document ID 258

{'also': 0.12988863039831225, 'analytical': 0.26467460701955103, 'based': 0.1704307447358744, 'bearing': 0.4545132958903335, 'capacity': 0.4082757719609241, 'carrying': 0.44305837743833826, 'compared': 0.16998511017361387, 'consequently': 0.42391612831509007, 'derived': 0.19103750478445003, 'effect': 0.09218542078944494, 'equation': 0.10854665920362061, 'flow': 0.09012434747486854, 'found': 0.12660984428377786, 'given': 0.11052385336735143, 'however': 0.2182139764355936, 'increase': 0.2925769392191645, 'laminar': 0.16233588617078312, 'length': 0.2255365250108158, 'load': 0.21514991999592978, 'loss': 0.3524654687089807, 'lubrication': 0.5619808910508631, 'mechanism': 0.3325804923459027, 'mixing': 0.3049936147025652, 'on': 0.047578484797422, 'one': 0.14442207513234676, 'power': 0.24237429107975692, 'prandtls': 0.5025196342446008, 'pressure': 0.1209694238143449, 'slider': 0.6214421478571256, 'solution': 0.10854665920362061, 'that': 0.04725898923138793, 'turbulent': 0.30128603528752607}

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Rankings Doc No Score Titles

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1 879 0.017456692408326365 flutter model testing at transonic speeds .

Vector Representation for the Rank 1 With Document ID 879

{'construction': 0.6160212861776635, 'delta': 0.5787323767443203, 'developed': 0.4978121471942074, 'facility': 0.6160212861776635, 'flutter': 0.5526983482918516, 'foot': 0.5787323767443203, 'model': 0.5259327851035132, 'on': 0.42601673821037095, 'plane': 0.5262001139141983, 'reflection': 0.6016963135823351, 'research': 0.5572561468233073, 'straight': 0.5852127917125465, 'swept': 0.5852127917125465, 'technique': 0.5308688906002428, 'test': 0.48680873223193777, 'testing': 0.5835068427569687, 'transonic': 0.5544686876848294, 'wing': 0.4872371226639216, 'x': 0.5282179917511679}

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2 880 0.014424189456131616 the design and testing of supersonic flutter models .

Vector Representation for the Rank 2 With Document ID 880

{'airplane': 0.5499075314628131, 'basic': 0.542795598025172, 'become': 0.5554895574872668, 'check': 0.5720632476607675, 'compared': 0.5050942562824993, 'edge': 0.47937045618325835, 'elsewhere': 0.6126879042641654, 'flutter': 0.5269793615314804, 'full': 0.5499075314628131, 'given': 0.4502570574877501, 'ii': 0.6126879042641654, 'included': 0.5066222320774161, 'leading': 0.49749161178534024, 'low': 0.4921136366472483, 'mach': 0.45117733280298317, 'number': 0.43567274355015867, 'on': 0.42163473831930676, 'parameter': 0.48584810509560794, 'problem': 0.45881007022295706, 'range': 0.4629199351642751, 'result': 0.44126696539248994, 'reviewed': 0.5620059428862417, 'scale': 0.5340912949691214, 'scaled': 0.6825802105031589, 'serve': 0.6066748502206574, 'simulate': 0.5856498693915145, 'speed': 0.46978101475458167, 'supersonic': 0.4727231176144587, 'table': 0.543894477419305, 'testing': 0.5525987804753556, 'these': 0.45045969502826017, 'those': 0.4895407720619186, 'transonic': 0.5284515226146159, 'velocity': 0.45906254773108923}

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3 496 0.013913077306230537 a theory of transonic aileron buzz, neglecting viscous effects .

Vector Representation for the Rank 3 With Document ID 496

{'agreement': 0.46664901552802507, 'aileron': 0.6360188432680618, 'airfoil': 0.54501999343555, 'analysis': 0.47819310871112825, 'approximation': 0.4754860065808916, 'around': 0.5119943836881011, 'boundary': 0.4364742639968101, 'buzz': 0.6360138033199166, 'by': 0.416449127051834, 'comparison': 0.47718198036771475, 'developed': 0.4679340101214309, 'distribution': 0.44788140827912826, 'due': 0.4757229499383703, 'effect': 0.4350105506139019, 'experimental': 0.45062435024437886, 'first': 0.4688839190434826, 'flow': 0.4236228006194187, 'flutter': 0.5060544261214087, 'from': 0.4268531416726982, 'harmonic': 0.5609965755900106, 'hinge': 0.5776390537615756, 'linearized': 0.509891746546803, 'local': 0.4819975501777597, 'moment': 0.488343669685809, 'neglected': 0.5241359835058924, 'nonsteady': 0.5776390537615756, 'numerical': 0.4700616220190694, 'observation': 0.5241359835058924, 'obtained': 0.4578881520752614, 'oscillation': 0.5211265006366078, 'perturbation': 0.5921414535611559, 'present': 0.4608895546448937, 'presented': 0.44708186955115403, 'pressure': 0.4317077089585486, 'region': 0.4683106567215697, 'result': 0.4425635328495045, 'satisfactory': 0.509219979076223, 'series': 0.4916597059014713, 'shock': 0.4581428655328161, 'show': 0.47233794601202816, 'solution': 0.45917264166326455, 'sponsored': 0.6002214894998331, 'stability': 0.488343669685809, 'supersonic': 0.46073907138404563, 'terminated': 0.5908489318434016, 'theoretical': 0.4630727346406883, 'theory': 0.43845830046817863, 'to': 0.40529972055542984, 'transonic': 0.553993614860156, 'twodimensional': 0.5456840603668864, 'unsteady': 0.5201820992064212, 'usaf': 0.6002214894998331, 'vicinity': 0.5338607561392326, 'viscous': 0.4828741833712375, 'wave': 0.462433899112719}

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4 38 0.012802939286364376 on the prediction of mixed subsonic/supersonic pressure distributions .

Vector Representation for the Rank 4 With Document ID 38

{'also': 0.45583804378960213, 'analyzed': 0.5236301647324147, 'by': 0.42576622645437634, 'can': 0.4581861819172229, 'considered': 0.4687528185265712, 'derive': 0.5755143645989503, 'distribution': 0.45419875047803704, 'empirical': 0.6268810603514431, 'flow': 0.437003205600425, 'high': 0.47049267075818935, 'improved': 0.567285270632083, 'introducing': 0.5787231725309615, 'linked': 0.6415909191373339, 'mechanism': 0.5429735923631638, 'part': 0.4976938646853144, 'physical': 0.5221548469122348, 'prediction': 0.5064859929055171, 'pressure': 0.44966756027848487, 'relation': 0.5653438413486732, 'result': 0.43970809905527053, 'rise': 0.5302036078681525, 'scheme': 0.5861235119072468, 'semiempirical': 0.5755143645989503, 'separately': 0.5725625474439006, 'shock': 0.4910760939048046, 'shown': 0.4587001697113354, 'significance': 0.5499524639833904,

'solution': 0.4466633075677234, 'speed': 0.4659713389826935, 'subsonic': 0.4984465036095487, 'supersonic': 0.4687528185265712, 'that': 0.4203162470961651, 'then': 0.488508756356138, 'theoretical': 0.47139437893785247, 'to': 0.40578353192219474, 'transonic': 0.5680516883942826, 'treated': 0.5143621843970072, 'tunnel': 0.47710959188440727, 'wind': 0.49059956878540323}

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5 440 0.010584600151416945 compilation of information on the transonic attachment of flows at the leading edge of airfoils .

Vector Representation for the Rank 5 With Document ID 440

{'affecting': 0.586888869197301, 'airfoil': 0.5772136702243456, 'analyzed': 0.518250295446964, 'angle': 0.4672551317586196, 'at': 0.4372122132345645, 'attachment': 0.586888869197301, 'attack': 0.48972622730256615, 'basic': 0.5291250861572385, 'camber': 0.5624393159145868, 'change': 0.4917046850413337, 'compiled': 0.6167758178351523, 'data': 0.46608758902685626, 'determine': 0.49308812703305116, 'dimensional': 0.49433497285870587, 'edge': 0.47177193929462674, 'factor': 0.5023073115095226, 'fixed': 0.5263017197769903, 'flow': 0.4449166099811245, 'from': 0.4290733615162084, 'having': 0.4927371465325193, 'increased': 0.5088301232513536, 'information': 0.5220467786944314, 'involved': 0.5245376897458165, 'leading': 0.48815826920078437, 'mach': 0.44627787970269195, 'number': 0.43225761961910986, 'on': 0.41956354038993093, 'past': 0.5111066065951448, 'photograph': 0.5535746394399526, 'profile': 0.49103279331193317, 'provide': 0.5204788205926496, 'related': 0.5263017197769903, 'schlieren': 0.5449283738753637, 'separated': 0.5263017197769903, 'shaped': 0.5709458852598596, 'speed': 0.4631005413817905, 'subsonic': 0.4941625222513149, 'these': 0.4456289448561538, 'thickness': 0.4745792468313138, 'to': 0.40647623068062355, 'transition': 0.4988206977447946, 'transonic': 0.5629229864428653, 'two': 0.4606392296262659, 'unseparated': 0.6555274429476381, 'variously': 0.631077889664924, 'vary': 0.5272179595838778, 'were': 0.4550491170517642}

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Query No: 14

Query Vector for weight (Version 1) are:

[('interaction', 0.1251629167387823),

('on', 0.06724297268101598),

('paper', 0.09620294470989911),

('shock', 0.1251629167387823),

('sound', 0.1251629167387823),

('wave', 0.09620294470989911)]

Query Vector for weight (Version 2) are:

[('interaction', 0.11021194605009633),

('on', 0.09006108817953544),

('paper', 0.10013651711481587),

('shock', 0.11021194605009633),

('sound', 0.11021194605009633),

('wave', 0.10013651711481587)]

Ranks Document Number Scores Titles

1 291 0.04427190881096882 sweepback effects in the turbulent boundary-layer shock-wave interaction .

Vector Representation for the Rank 1 With Document ID 291

{'ahead': 0.360269433606657, 'angle': 0.163564324255595, 'at': 0.08093923824135008, 'available': 0.24553235789630273, 'boundary': 0.09603948854195138, 'by': 0.04331179236839078, 'can': 0.13535079247784257, 'configuration': 0.2488111440108371, 'dimensional': 0.163564324255595, 'experiment': 0.20257362008142774, 'extension': 0.2930042119027183, 'influence': 0.23638689930953372, 'interaction': 0.2488111440108371, 'layer': 0.10832975779775116, 'moderate': 0.31893521336122166, 'on': 0.047578484797422, 'peak': 0.360269433606657, 'pressure':

0.1209694238143449, 'reattachment': 0.4014093514806447, 'reported': 0.3325804923459027, 'rise': 0.43884525649832795, 'separation': 0.3292726661580189, 'shock': 0.15309455095854613, 'show': 0.19047126866708147, 'simple': 0.17549188555788003, 'sweep': 0.3644548715088276, 'sweptback': 0.42391612831509007, 'that': 0.04725898923138793, 'theory': 0.10126360623697798, 'turbulent': 0.20793689516404892, 'two': 0.1051403770694433, 'understood': 0.4833773851213525, 'upstream': 0.31403190967724753, 'wave': 0.16439316606881269}

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2 1317 0.03323795020750027 shock-tube testing time .

Vector Representation for the Rank 2 With Document ID 1317

{'attenuation': 0.4833773851213525, 'between': 0.1415028515150645, 'conservation': 0.42391612831509007, 'difference': 0.2582216064253042, 'effect': 0.09218542078944494, 'equation': 0.10854665920362061, 'example': 0.2058861729589721, 'experimentally': 0.29681748236510425, 'explanation': 0.4329544232897724, 'given': 0.11052385336735143, 'ideal': 0.3562787391713667, 'investigation': 0.1639777441416276, 'led': 0.4329544232897724, 'mass': 0.2582216064253042, 'numerical': 0.1844775358789806, 'obtained': 0.10619038357284823, 'shock': 0.15309455095854613, 'test': 0.15875271962933116, 'theoretical': 0.24063146214233447, 'time': 0.27679999916474657, 'to': 0.009721840107770649, 'wave': 0.16439316606881269}

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3 326 0.030459616885223355 forst-order slip effects on the compressible laminar boundary layer over a slender body of revolution in axial flow .

Vector Representation for the Rank 3 With Document ID 326

{'analysis': 0.14343792139007638, 'boundary': 0.13915450988636802, 'case': 0.11555798590132785, 'compressible': 0.2354284037477369, 'considered': 0.15993055680978174, 'curvature': 0.29115931369431924, 'effect': 0.09218542078944494, 'examined': 0.29681748236510425, 'first': 0.1813765551041639, 'flow': 0.06220061601834868, 'gradient': 0.2189974016094449, 'interaction': 0.2488111440108371, 'layer': 0.15696225147919476, 'no': 0.20064579827032275, 'only':

0.16692885196679205, 'order': 0.17223680008179437, 'pressure': 0.0834887895608359, 'slip': 0.3835971206320758, 'transverse': 0.2858513655793169, 'zero': 0.20322597653563415}

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4 1140 0.02856568708913625 shock-standoff distance for spherical bodies at high mach numbers .

Vector Representation for the Rank 4 With Document ID 1140

{'accurate': 0.32653464042795, 'almost': 0.4305425982496091, 'apropriate': 0.7509775004326937, 'behind': 0.3150953381735983, 'by': 0.05233983836505397, 'consideration': 0.2941521179759523, 'development': 0.303402320792395, 'distance': 0.25909106232649964, 'dyke': 0.5354108567977349, 'expression': 0.2868315024929699, 'give': 0.24558703719724512, 'hay': 0.7509775004326937, 'heat': 0.1765388542942732, 'method': 0.11765842405816515, 'prediction': 0.2993364803607412, 'ratio': 0.16284879835226998, 'shock': 0.18500605986439667, 'shockstandoff': 0.7509775004326937, 'simple': 0.2120719652133681, 'specific': 0.33368683078438854, 'sponsored': 0.6370891515767835, 'theory': 0.12237131028024509, 'those': 0.23796112640068073, 'usaf': 0.6370891515767835, 'van': 0.5023981461279287}

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5 609 0.027550435777397055 on three dimensional bodies of delta planform which can support plane attached shock waves .

Vector Representation for the Rank 5 With Document ID 609

{'also': 0.12988863039831225, 'attached': 0.3387105610060959, 'available': 0.24553235789630273, 'body': 0.13961047050608286, 'calculation': 0.17361674072744135, 'can': 0.13535079247784257, 'collect': 0.5619808910508631, 'detail': 0.255770455090685, 'discus': 0.3488145151546617, 'from': 0.07070634769260985, 'future': 0.3891335228376759, 'given': 0.11052385336735143, 'illustrating': 0.44305837743833826, 'includes': 0.3524654687089807, 'merit': 0.42391612831509007, 'note': 0.2499325254733439, 'on': 0.047578484797422, 'one': 0.14442207513234676, 'plane': 0.23079027635009564, 'possible': 0.21590573510828764, 'preliminary': 0.32685940877657377, 'property': 0.2238544228750751, 'proposed': 0.31168150346321444, 'report': 0.24770423239070574,

'result': 0.066747412341137, 'shape': 0.17549188555788003, 'shock': 0.15309455095854613, 'such': 0.17789496875257943, 'support': 0.3524654687089807, 'test': 0.23002160078661651, 'theoretical': 0.16607526820455334, 'together': 0.4419144418274188, 'tunnel': 0.17936980955453063, 'wave': 0.16439316606881269, 'wind': 0.21074975241888858, 'work': 0.23833663006222613}

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Rankings Doc No Score Titles

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1 291 0.02567094417775067 sweepback effects in the turbulent boundary-layer shock-wave interaction .

Vector Representation for the Rank 1 With Document ID 291

{'ahead': 0.5703799144917274, 'angle': 0.4773534276876563, 'at': 0.4354648029543454, 'available': 0.5161180445549496, 'boundary': 0.44541933985849125, 'by': 0.4204831684063067, 'can': 0.4640105829070708, 'configuration': 0.517668659860385, 'dimensional': 0.4773534276876563, 'experiment': 0.49580184397612903, 'extension': 0.5385686042524664, 'influence': 0.511792941433094, 'interaction': 0.517668659860385, 'layer': 0.4512316981369061, 'moderate': 0.550831986596494, 'on': 0.42250098791417684, 'peak': 0.5703799144917274, 'pressure': 0.45300465969649684, 'reattachment': 0.5898359522115957, 'reported': 0.5572851609425697, 'rise': 0.5922869659676546, 'separation': 0.5442760084883067, 'shock': 0.47240202489658145, 'show': 0.4900783564782236, 'simple': 0.48299425281798625, 'sweep': 0.5723593068169193, 'sweptback': 0.6004799379479042, 'that': 0.4223498909235817, 'theory': 0.4478899483618625, 'turbulent': 0.4983382632910418, 'two': 0.449723364747835, 'understood': 0.628600569078889, 'upstream': 0.5485130986074713, 'wave': 0.4777454065348471}

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2 609 0.018048331432503246 on three dimensional bodies of delta planform which can support plane attached shock waves .

Vector Representation for the Rank 2 With Document ID 609

{'also': 0.46173638631162445, 'attached': 0.5609899648489256, 'available': 0.5167021351492143, 'body': 0.4663572008872547, 'calculation': 0.4825204649771543, 'can': 0.46433256541678936, 'collect': 0.6671109032659246, 'detail': 0.5215683279911134, 'discus': 0.5657923991703742, 'from': 0.4336069014081445, 'future': 0.5849561229419372, 'given': 0.4525322600385569, 'illustrating': 0.6105867393031668, 'includes': 0.5675277063973734, 'merit': 0.601488381093351, 'note': 0.518793545648648, 'on': 0.4226141711446791, 'one': 0.4686441684307179, 'plane': 0.5096951874388322, 'possible': 0.5026205282838497, 'preliminary': 0.5553570829713047, 'property': 0.506398559179518, 'proposed': 0.5481429871497279, 'report': 0.5177344324518777, 'result': 0.4317252096735271, 'shape': 0.4834117259388505, 'shock': 0.4727662175757632, 'such': 0.48455391730688624, 'support': 0.5675277063973734, 'test': 0.501127320578558, 'theoretical': 0.4789359844910349, 'together': 0.5942844640422835, 'tunnel': 0.4852549127767606, 'wave': 0.4781364771981392, 'wind': 0.5001698769978005, 'work': 0.5132819879662347}

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3 1317 0.017887423810201815 shock-tube testing time .

Vector Representation for the Rank 3 With Document ID 1317

{'attenuation': 0.6458254526102559, 'between': 0.47196241195810135, 'conservation': 0.6155859527554903, 'difference': 0.5313206724748029, 'effect': 0.4468816363511566, 'equation': 0.4552022755912801, 'example': 0.5047050673277289, 'experimentally': 0.5509489152594931, 'explanation': 0.6201824502776457, 'given': 0.4562077935678306, 'ideal': 0.5811884151142588, 'investigation': 0.4833921991644365, 'led': 0.6201824502776457, 'mass': 0.5313206724748029, 'numerical': 0.49381753294579583, 'obtained': 0.4540039726891621, 'shock': 0.4778574638366673, 'test': 0.4807349709713705, 'theoretical': 0.5106401041229157, 'time': 0.5272700604324784, 'to': 0.4049441198911225, 'wave': 0.4836034653229657}

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4 1276 0.017737746103513446 a three-dimensional linearized analysis of the forces exerted on a rigid wing by a shock wave .

Vector Representation for the Rank 4 With Document ID 1276

{'acoustic': 0.6133739118018908, 'author': 0.5245599728776573, 'by': 0.422635696750772, 'dimensional': 0.48548231880139464, 'distribution': 0.4658897602523783, 'edge': 0.4912232514508652, 'flat': 0.4924652380367039, 'found': 0.466169093546025, 'front': 0.5680209612879695, 'ha': 0.46253746315530136, 'induced': 0.5419717365382082, 'moving': 0.5628916193356822, 'obliquely': 0.7247793554096444, 'on': 0.424865564199593, 'plate': 0.5076594122692809, 'pressure': 0.44363308049027567, 'shock': 0.4800105846513601, 'solution': 0.45672887513276195, 'striking': 0.6444496744034084, 'term': 0.49780879878575807, 'two': 0.4549486770568892}

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5 1314 0.016954902941889848 production of high temperature gases in shock tubes .

Vector Representation for the Rank 5 With Document ID 1314

{'aerodynamic': 0.490098033522514, 'briefly': 0.5396733209935751, 'calcualtions': 0.6825802105031589, 'calculation': 0.47894645593448254, 'comparison': 0.4924102741134845, 'discussed': 0.4749421597689022, 'experimental': 0.482412077764572, 'finally': 0.5396733209935751, 'forth': 0.6197998377018066, 'gas': 0.48818148335191924, 'high': 0.47456344185400745, 'intended': 0.5856498693915145, 'k': 0.5540173964041313, 'made': 0.4538538033956382, 'paper': 0.47590536028250163, 'preliminary': 0.5486284778969602, 'production': 0.6891810648819041, 'result': 0.4303511725024419, 'set': 0.5203520012672537, 'shock': 0.515404103378919, 'strength': 0.5262636049575402, 'strong': 0.5899068018947953, 'study': 0.4853480003118644, 'surveyed': 0.6825802105031589, 'temperature': 0.46522363853225823, 'theoretical': 0.4755172213703805, 'thermodynamic': 0.5570194649004543, 'to': 0.40601058266091666, 'tube': 0.5185650794309511, 'up': 0.4936199102282519, 'useful': 0.5396733209935751, 'wave': 0.5016370051958179}

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Query No: 15

Query Vector for weight (Version 1) are:

[('material', 0.22510656507197047),

('photoelastic', 0.1553605369642814),

('property', 0.11941349352594524)]

Query Vector for weight (Version 2) are:

[('material', 0.19897810218978104),

('photoelastic', 0.1738562091503268),

('property', 0.15676749144637073)]

Ranks Document Number Scores Titles

1 509 0.06188354885861543 a graphical approximation for temperatures and sublimation rates at surfaces subjected to small net and large gross heat transfer rates .

Vector Representation for the Rank 1 With Document ID 509

{'acted': 0.5271982855734489, 'at': 0.055861380633815266, 'by': 0.06275576151877217, 'change': 0.22302558106185744, 'condition': 0.1242304617275272, 'conduction': 0.3093937822796063, 'considers': 0.36885503908586875, 'derived': 0.19103750478445003, 'entry': 0.3164485331545604, 'heat': 0.14608784514803438, 'heated': 0.3524654687089807, 'heating': 0.2545706528709851, 'material': 0.26203487688769017, 'method': 0.09736364101196376, 'most': 0.23261554649289723, 're': 0.32685940877657377, 'severe': 0.3891335228376759, 'space': 0.36885503908586875, 'state': 0.2731192355396403, 'sublimation': 0.5271982855734489, 'such': 0.17789496875257943, 'suitable': 0.3049936147025652, 'surface': 0.12634218584411033, 'under': 0.18036731451851562, 'upon': 0.2545706528709851, 'vehicle': 0.2716527987994464}

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2 1096 0.03652143867065829 qualitative measurements of the effective heats of ablation of several materials in supersonic air jets at stagnation temperature up to 11,000 f.

Vector Representation for the Rank 2 With Document ID 1096

{'ablation': 0.4014093514806447, 'air': 0.17692564250327128, 'ammonium': 0.5619808910508631, 'at': 0.055861380633815266, 'carbonate': 0.5619808910508631, 'chloride': 0.5619808910508631, 'content': 0.5025196342446008, 'derived': 0.19103750478445003, 'effective': 0.3093937822796063, 'f': 0.5054078653948213, 'fiber': 0.5025196342446008, 'from': 0.10244855848771407, 'glass': 0.4833773851213525, 'heat': 0.14608784514803438, 'included': 0.23448049951385272, 'inorganic': 0.5619808910508631, 'jet': 0.23169805688805684, 'laminate': 0.6214421478571256, 'lucite': 0.5619808910508631, 'material': 0.37967023169343117, 'melamine': 0.6214421478571256, 'number': 0.07845045600431105, 'nylon': 0.5271982855734489, 'phenolic': 0.5619808910508631, 'plastic': 0.33559078227780864, 'polystyrene': 0.6214421478571256, 'ranging': 0.360269433606657, 'reinforcement': 0.6214421478571256, 'resin': 0.7638734874130575, 'salt': 0.5619808910508631, 'several': 0.21666826866528383, 'sodium': 0.5025196342446008, 'stagnation': 0.20793689516404892, 'supersonic': 0.15993055680978174, 'teflon': 0.4545132958903335, 'temperature': 0.14343792139007638, 'test': 0.15875271962933116, 'to': 0.009721840107770649, 'type': 0.17789496875257943, 'varied': 0.29488966055399934, 'were': 0.1338793248336025}

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3 592 0.03652143867065829 design of axial compressors .

Vector Representation for the Rank 3 With Document ID 592

{'advocated': 0.5619808910508631, 'aerodynamic': 0.19814096454326377, 'air': 0.17692564250327128, 'also': 0.12988863039831225, 'axial': 0.22725227141027599, 'bending': 0.2731192355396403, 'blade': 0.46965022359082137, 'coefficient': 0.1579763843732755, 'compressor': 0.3644548715088276, 'considered': 0.15993055680978174, 'construction': 0.3950520390840711, 'curve': 0.23261554649289723, 'described': 0.22220467087088383, 'design': 0.21292162691329164, 'different': 0.3207808785619178, 'due': 0.19938423935311986, 'efficiency': 0.3950520390840711, 'estimate': 0.2841526078838075, 'flow': 0.09012434747486854, 'form': 0.1579763843732755, 'generalized': 0.31403190967724753, 'loading': 0.2335429550964559, 'main': 0.27924930419983346, 'make': 0.3214961336939525, 'mass': 0.2582216064253042, 'material': 0.26203487688769017, 'method': 0.09736364101196376, 'outlet': 0.4833773851213525, 'performance': 0.3028753722576236, 'power': 0.24237429107975692, 'pressure': 0.0834887895608359, 'ratio': 0.13475917316521085, 'rise':

0.3028753722576236, 'rotational': 0.37839647016748407, 'speed': 0.1534603701070292, 'stage': 0.34194809467438225, 'stress': 0.19160750329564033, 'temperature': 0.14343792139007638, 'to': 0.014086267179562515, 'type': 0.17789496875257943, 'use': 0.18395285864509878, 'variable': 0.24237429107975692, 'weight': 0.3241358638258134}

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4 119 0.035932383208228315 conduction of fluctuating heat flow in a wall consisting of many layers .

Vector Representation for the Rank 4 With Document ID 119

{'analogy': 0.3325804923459027, 'between': 0.1415028515150645, 'body': 0.13961047050608286, 'bounded': 0.4833773851213525, 'by': 0.04331179236839078, 'case': 0.11555798590132785, 'certain': 0.21292162691329164, 'conduction': 0.3093937822796063, 'consequence': 0.42391612831509007, 'consisting': 0.4014093514806447, 'different': 0.22139154193623733, 'draw': 0.5619808910508631, 'four': 0.2987896257790135, 'from': 0.07070634769260985, 'generalizes': 0.5619808910508631, 'gorcum': 0.6214421478571256, 'gorcums': 0.6214421478571256, 'ha': 0.11966097837637452, 'heat': 0.14608784514803438, 'idea': 0.37839647016748407, 'important': 0.25106876010190277, 'infinite': 0.26074486069362346, 'interesting': 0.3562787391713667, 'layer': 0.10832975779775116, 'made': 0.118433711946317, 'material': 0.26203487688769017, 'number': 0.07845045600431105, 'paper': 0.16692885196679205, 'parallel': 0.26739815197031136, 'passive': 0.5619808910508631, 'plane': 0.23079027635009564, 'pointed': 0.32685940877657377, 'pole': 0.6214421478571256, 'regard': 0.42391612831509007, 'solid': 0.31168150346321444, 'stratiform': 0.6214421478571256, 'theory': 0.10126360623697798, 'through': 0.20257362008142774, 'to': 0.009721840107770649, 'two': 0.1051403770694433, 'van': 0.6023782119076675, 'wave': 0.16439316606881269}

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5 1099 0.035340754522434584 a theoretical study of stagnation point ablation .

Vector Representation for the Rank 5 With Document ID 1099

{'ablation': 0.6086012866104468, 'analysis': 0.18386193211606205, 'at': 0.0517306337157308, 'automatic': 0.41029581399344117, 'capacity': 0.3780852563019674, 'discussed':

0.1526234614487881, 'effective': 0.28651523187277417, 'enthalpy': 0.2930483094538725, 'given': 0.10235101443118594, 'good': 0.1852224845107199, 'heat': 0.18725866358969678, 'increase': 0.1869944764155687, 'linearly': 0.3336288129190638, 'made': 0.10967596759648604, 'material': 0.3358821591909818, 'mechanism': 0.42630910511130277, 'most': 0.21541446873807338, 'parameter': 0.17483396527288209, 'place': 0.3336288129190638, 'point': 0.1574153265054878, 'property': 0.20730119850254605, 'reduces': 0.35041542073362547, 'result': 0.061811682778245364, 'shielding': 0.7965784284662087, 'significant': 0.352002741382515, 'simplified': 0.2930483094538725, 'stagnation': 0.19256071435524527, 'stream': 0.14522826422286164, 'surface': 0.116999638472775, 'take': 0.27133761090628217, 'that': 0.043764358022771316, 'thermal': 0.2263892711532442, 'transfer': 0.16207720315867485}

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Rankings Doc No Score Titles

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1 509 0.028780185362240664 a graphical approximation for temperatures and sublimation rates at surfaces subjected to small net and large gross heat transfer rates .

Vector Representation for the Rank 1 With Document ID 509

{'acted': 0.6725109590639371, 'at': 0.42887497707735966, 'by': 0.4291629329558567, 'change': 0.5152828388370986, 'condition': 0.4642152358926964, 'conduction': 0.5599269167685637, 'considers': 0.5906626846244781, 'derived': 0.4987480708313855, 'entry': 0.5635735464703271, 'heat': 0.4755134071530064, 'heated': 0.5821908483832174, 'heating': 0.5315886160136986, 'material': 0.5354469040641762, 'method': 0.45032766592036005, 'most': 0.5202399313552581, 're': 0.5689549708377533, 'severe': 0.6011447161613533, 'space': 0.5906626846244781, 'state': 0.5411764545758323, 'sublimation': 0.6725109590639371, 'such': 0.4919546399789279, 'suitable': 0.557652452076105, 'surface': 0.46530679476160014, 'under': 0.4932326056594879, 'upon': 0.5315886160136986, 'vehicle': 0.5404184474020378}

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2 1099 0.022190326409315755 a theoretical study of stagnation point ablation .

Vector Representation for the Rank 2 With Document ID 1099

{'ablation': 0.6798972212550309, 'analysis': 0.4878193998923873, 'at': 0.42503961711967264, 'automatic': 0.5985989606208144, 'capacity': 0.5830078113563821, 'discussed': 0.4738756277210393, 'effective': 0.5386843962606798, 'enthalpy': 0.5418466571783163, 'given': 0.44954182906882995, 'good': 0.4896548091714674, 'heat': 0.48944180707682766, 'increase': 0.49051252143303364, 'linearly': 0.5614891822414289, 'made': 0.45308738823763006, 'material': 0.5604299993763335, 'mechanism': 0.6036213225253315, 'most': 0.5042688912121102, 'parameter': 0.48462636614899757, 'place': 0.5614891822414289, 'point': 0.4761950747815228, 'property': 0.5003417562498284, 'reduces': 0.569614546309546, 'result': 0.429919232746984, 'shielding': 0.7804759296827393, 'significant': 0.5681297980115546, 'simplified': 0.5418466571783163, 'stagnation': 0.49320679476384954, 'stream': 0.47029606772416743, 'surface': 0.45663232672921106, 'take': 0.531337843734823, 'that': 0.42118363317179375, 'thermal': 0.5095811178503925, 'transfer': 0.47845160245323864}

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3 405 0.021425756797613674 tables of thermal properties of gases .

Vector Representation for the Rank 3 With Document ID 405

{'air': 0.5014423677946904, 'argon': 0.6482394367729205, 'carbon': 0.7477739055150967, 'dioxide': 0.7022752475514293, 'hydrogen': 0.6482394367729205, 'monoxide': 0.7563110583299382, 'nitrogen': 0.6199398552158644, 'oxygen': 0.6340896459943924, 'property': 0.5283495279512219, 'steam': 0.7222182575514198, 'table': 0.5814394342965952, 'thermodynamic': 0.5979889944078587, 'transport': 0.6042765445703107}

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4 817 0.01867881445825945 loading paths and the incremental stress law .

Vector Representation for the Rank 4 With Document ID 817

{'also': 0.4550861898520269, 'by': 0.4255251720715569, 'concerned': 0.5352614594505821, 'deformation': 0.526717650351733, 'differential': 0.5324185651441794, 'directly': 0.5352614594505821, 'expressed': 0.5293487821962573, 'flow': 0.42637948319566166, 'function': 0.503145033757715, 'given': 0.4468735250429634, 'hardening': 0.6235865045285709, 'incremental': 0.5731510804083014, 'introduced': 0.5275737243933856, 'law': 0.5902199520552377, 'material': 0.511129842017915, 'meant': 0.663555632497868, 'occasion': 0.6383379204377333, 'paper': 0.4707950680750506, 'plastic': 0.5977755247441795, 'prager': 0.663555632497868, 'property': 0.4949373875134227, 'refer': 0.6050019183766614, 'shall': 0.5836173765592737, 'strain': 0.6445390095512555, 'stress': 0.5402401067386821, 'that': 0.4200426907654033, 'to': 0.4057294244369372, 'total': 0.5010793385998371, 'w': 0.5702390091898999, 'we': 0.5510989699872122, 'work': 0.5010793385998371}

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5 1096 0.01696896599391579 qualitative measurements of the effective heats of ablation of several materials in supersonic air jets at stagnation temperature up to 11,000 f.

Vector Representation for the Rank 5 With Document ID 1096

{'ablation': 0.5825275923599177, 'air': 0.48045106929804743, 'ammonium': 0.655542175630508, 'at': 0.42540111055056695, 'carbonate': 0.655542175630508, 'chloride': 0.655542175630508, 'content': 0.6285041407578571, 'derived': 0.486867970738926, 'effective': 0.5406865633855272, 'f': 0.6156565478780982, 'fiber': 0.6285041407578571, 'from': 0.4437145995764993, 'glass': 0.6197998377018066, 'heat': 0.4664286034930727, 'included': 0.5066222320774161, 'inorganic': 0.655542175630508, 'jet': 0.5053570085556103, 'laminate': 0.6825802105031589, 'lucite': 0.655542175630508, 'material': 0.5620045454479032, 'melamine': 0.6825802105031589, 'number': 0.43567274355015867, 'nylon': 0.6397259391368163, 'phenolic': 0.655542175630508, 'plastic': 0.5525987804753556, 'polystyrene': 0.6825802105031589, 'ranging': 0.5638205788543147, 'reinforcement': 0.6825802105031589, 'resin': 0.7259433233838071, 'salt': 0.655542175630508, 'several': 0.49852271073005383, 'sodium': 0.6285041407578571, 'stagnation': 0.49455240815165846, 'supersonic': 0.4727231176144587, 'teflon': 0.6066748502206574, 'temperature': 0.46522363853225823, 'test': 0.4721875352122385, 'to': 0.4044206844250987, 'type': 0.4808918382682891, 'varied': 0.5340912949691214, 'were': 0.46087718369916225}

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Query No: 16

Query Vector for weight (Version 1) are:

[('about', 0.048101472354949555),

('body', 0.03362148634050799),

('by', 0.048101472354949555),

('calculated', 0.048101472354949555),

('can', 0.03362148634050799),

('computer', 0.06258145836939115),

('electronic', 0.06258145836939115),

('flow', 0.021930998360423306),

('potential', 0.048101472354949555),

('revolution', 0.03963122352553445),

('transverse', 0.048101472354949555)]

Query Vector for weight (Version 2) are:

[('about', 0.04575883575292521),

('body', 0.04201838681343268),

('by', 0.04575883575292521),

('calculated', 0.04575883575292521),

('can', 0.04201838681343268),

('computer', 0.04949928469241774),

('electronic', 0.04949928469241774),

('flow', 0.038998516951428246),

('potential', 0.04575883575292521),

('revolution', 0.04357081338745986),

('transverse', 0.04575883575292521)]

Ranks Document Number Scores Titles

1 1358 0.03646149067212035 compressive buckling of simply supported plates with transverse stiffeners .

Vector Representation for the Rank 1 With Document ID 1358

{'analysis': 0.17333657210766806, 'both': 0.2038183526493618, 'chart': 0.40190461444533776, 'compression': 0.347529448406001, 'equally': 0.5232008027208732, 'flexural': 0.5122785371621799, 'longitudinal': 0.3586870503712895, 'plate': 0.19184363497909526, 'presented': 0.14981083400150466, 'rectangular': 0.3374569059866435, 'rigidity': 0.5232008027208732, 'several': 0.26183128290606894, 'simply': 0.3738847937284974, 'spaced': 0.5354108567977349, 'stability': 0.2811026613971851, 'stiffener': 0.46355530891941527, 'supported': 0.36856744140554065, 'that': 0.057109801336041384, 'torsional': 0.485080377094971, 'transverse': 0.3454351217699856, 'under': 0.21796364389499664}

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2 920 0.03578814875918636 supersonic flow over an inclined wing of zero aspect ratio .

Vector Representation for the Rank 2 With Document ID 920

{'approximation': 0.24019058098446416, 'asymptotic': 0.37948970696423406, 'at': 0.06750530221317826, 'distribution': 0.152354903827028, 'expression': 0.2868315024929699, 'found': 0.15300079777058181, 'incidence': 0.3355547307357344, 'laminar': 0.19617368800528992, 'lift': 0.24798866528445648, 'linearized': 0.3496669600635051, 'long': 0.3318519927509069, 'narrow': 0.5492534744193474, 'on': 0.05749589356104888, 'potential': 0.3318519927509069, 'stream': 0.18951397193648478, 'supersonic': 0.19326698423974895, 'theory': 0.12237131028024509, 'used': 0.17492534868552315, 'wing': 0.19279035975607345}

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3 161 0.03405788586104044 supersonic flow past a family of blunt symmetric bodies .

Vector Representation for the Rank 3 With Document ID 161

{'assumed': 0.26183128290606894, 'body': 0.16871131534354014, 'bow': 0.4215225079418247, 'carried': 0.32653464042795, 'computation': 0.3635095776851176, 'detached': 0.45727061854237766, 'emphasis': 0.5122785371621799, 'free': 0.20595586430686588, 'gas': 0.23434871760537254, 'mach': 0.13600749110761504, 'number': 0.09480291538170249, 'numerical': 0.22293061270158732, 'on': 0.05749589356104888, 'out': 0.2512799144964561, 'paraboloid': 0.6370891515767835, 'perfect': 0.40190461444533776, 'result': 0.08066045255080079, 'revolution': 0.3105545111488335, 'sphere': 0.37948970696423406, 'stream': 0.18951397193648478, 'summarized': 0.49337805582014427, 'taken': 0.3282769611482099, 'unyawed': 0.5354108567977349, 'wave': 0.1986597937849511}

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4 106 0.033372004263582125 the transverse potential flow past a body of revolution .

Vector Representation for the Rank 4 With Document ID 106

{'along': 0.20064579827032275, 'angle': 0.23699327976679202, 'at': 0.08093923824135008, 'axis': 0.28935325834839926, 'azimuthal': 0.5619808910508631, 'body': 0.20228581902321388, 'by': 0.04331179236839078, 'component': 0.2716527987994464, 'consideration': 0.24341411545136124, 'elementary': 0.42391612831509007, 'entirely': 0.4082757719609241, 'flow': 0.06220061601834868, 'fluid': 0.1921813145342394, 'incompressible': 0.21074975241888858, 'inviscid': 0.25222024665695203, 'manner': 0.2716527987994464, 'meridian': 0.4833773851213525, 'past': 0.270211009225151, 'perpendicular': 0.4014093514806447, 'potential': 0.2746111768021922, 'revolution': 0.256987276348298, 'right': 0.44305837743833826, 'round': 0.4329544232897724, 'set': 0.26467460701955103, 'shown': 0.1978462152873054, 'simple': 0.17549188555788003, 'stream': 0.1568248978182262, 'surface': 0.12634218584411033, 'that': 0.04725898923138793, 'to': 0.014086267179562515, 'vary': 0.3093937822796063, 'velocity': 0.12988863039831225}

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5 339 0.03148202087611073 experimental evaluation of heat transfer with transpiration cooling in a turbulent boundary layer at m=3 .2.

Vector Representation for the Rank 5 With Document ID 339

{'accelerator': 0.5619808910508631, 'analytic': 0.3488145151546617, 'boundary': 0.09603948854195138, 'by': 0.04331179236839078, 'calculated': 0.1866089364588232, 'can': 0.13535079247784257, 'conductivity': 0.3524654687089807, 'current': 0.360269433606657, 'electrical': 0.3835971206320758, 'field': 0.26577924259061636, 'found': 0.12660984428377786, 'integration': 0.2875844439235415, 'investigation': 0.1639777441416276, 'layer': 0.10832975779775116, 'physically': 0.4014093514806447, 'prescribed': 0.3488145151546617, 'reasonable': 0.3164485331545604, 'related': 0.3071654891969682, 'that': 0.04725898923138793, 'to': 0.009721840107770649, 'velocity': 0.12988863039831225, 'work': 0.23833663006222613}

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Rankings Doc No Score Titles

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1 106 0.02462083983567108 the transverse potential flow past a body of revolution .

Vector Representation for the Rank 1 With Document ID 106

{'along': 0.4925734941182317, 'angle': 0.5021268972065037, 'at': 0.4348789352676208, 'axis': 0.533501136782931, 'azimuthal': 0.6592854431078838, 'body': 0.4871705014844558, 'by': 0.41998309454087557, 'component': 0.525334539714512, 'consideration': 0.5123058413347502, 'elementary': 0.5955854423541397, 'entirely': 0.5883693309307211, 'flow': 0.42869797628838097, 'fluid': 0.48866817019861253, 'incompressible': 0.4972352331030819, 'inviscid': 0.5163687937732899, 'manner': 0.525334539714512, 'meridian': 0.6230195394280348, 'past': 0.5246693301769769, 'perpendicular': 0.5852013177381993, 'potential': 0.5266994693118302, 'revolution': 0.5185681949015343, 'right': 0.6044172489600936, 'round': 0.5997555099752435, 'set': 0.5221149577384085, 'shown': 0.48525735460189057, 'simple': 0.4809680400762856, 'stream': 0.4723555084677553, 'surface': 0.4582914653531233, 'that': 0.4218042430958424, 'to': 0.4060701584521137, 'vary': 0.5427473873412028, 'velocity': 0.4599277157351858}

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2 339 0.024358108699563917 experimental evaluation of heat transfer with transpiration cooling in a turbulent boundary layer at m=3 .2.

Vector Representation for the Rank 2 With Document ID 339

{'accelerator': 0.6937035928081268, 'analytic': 0.5822981492003731, 'boundary': 0.45019235224080445, 'by': 0.422635696750772, 'calculated': 0.49752594075854323, 'can': 0.470737305615204, 'conductivity': 0.5842062179499601, 'current': 0.5882847419088619, 'electrical': 0.600476305003574, 'field': 0.5243954348323326, 'found': 0.466169093546025, 'integration': 0.5502979652175162, 'investigation': 0.4856983811405233, 'layer': 0.4566155176802161, 'physically': 0.6097853692074651, 'prescribed': 0.5822981492003731, 'reasonable': 0.5653829740590666, 'related': 0.5605314508027468, 'that': 0.42469858877903194, 'to': 0.40508084779007186, 'velocity': 0.46788265939358864, 'work': 0.5245599728776573}

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3 498 0.02009810102862976 calculation of potential flow about bodies of revolution having axes perpendicular to the free-stream direction .

Vector Representation for the Rank 3 With Document ID 498

{'about': 0.48747450488114136, 'accuracy': 0.4816736755627976, 'after': 0.49807676115461, 'agreement': 0.4568275842837173, 'aid': 0.5166620413134543, 'also': 0.44206038967552286, 'analytic': 0.5129527225507975, 'angle': 0.45296521484680535, 'arbitrary': 0.4788220840962843, 'at': 0.42709164144270917, 'attack': 0.47066180352645925, 'ax': 0.5346244562044946, 'axisymmetric': 0.4948802931511851, 'basic': 0.5016894585081809, 'body': 0.5013281694009195, 'by': 0.41402517571379, 'calculate': 0.5727879931676497, 'calculated': 0.49050156546770696, 'calculating': 0.49549083700512275, 'case': 0.43741985655113647, 'certain': 0.46894804087822384, 'combined': 0.4967537193419529, 'compared': 0.4550443864949074, 'comparison': 0.46580840631751325, 'computer': 0.5058432447866688, 'data': 0.45204574372224327, 'derived': 0.46186154915355804, 'described': 0.4719540656937446, 'direction': 0.4798574322740758, 'distribution': 0.46114400337747846, 'electronic': 0.5401988126248324, 'ellipsoid': 0.5707167537257746, 'equation': 0.43514945665436616, 'exhibit': 0.5346244562044946, 'exhibited': 0.5401988126248324,

'experimental': 0.4431643214461462, 'flow': 0.44300913369925154, 'forward': 0.4948802931511851, 'free': 0.4551886913758203, 'general': 0.4530990880076264, 'make': 0.5041065151035524, 'method': 0.4566109373258536, 'off': 0.5041065151035524, 'on': 0.41540681123985823, 'other': 0.4544745485212603, 'perpendicular': 0.5299839230801082, 'point': 0.4550443864949074, 'possible': 0.46991435142542537, 'potential': 0.48892428128724175, 'presented': 0.44014386242551706, 'pressure': 0.44049037681497566, 'property': 0.47248828652547925, 'quite': 0.5067541010477392, 'region': 0.45824436522530143, 'revolution': 0.549422211861486, 'satisfactory': 0.4931252700020761, 'selected': 0.5279253053560707, 'separated': 0.49946598197916603, 'solution': 0.45264293752826257, 'stream': 0.4507828613854131, 'surface': 0.4409119840032562, 'then': 0.46666982812045255, 'these': 0.43593401431749457, 'to': 0.40627685557633464, 'type': 0.45760574797119175, 'variety': 0.5153697791461689, 'velocity': 0.44206038967552286, 'whose': 0.49807676115461}

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4 93 0.0200063186803319 the supersonic blunt body problem - review and extensions .

Vector Representation for the Rank 4 With Document ID 93

{'adequate': 0.5621221775166629, 'analytical': 0.5102696660787975, 'approximation': 0.48280823623014885, 'blunt': 0.495041484906768, 'body': 0.48126371410597973, 'by': 0.41804471133637644, 'computer': 0.5361773169945373, 'conic': 0.6196432047718297, 'described': 0.49257569184289574, 'detached': 0.5576488688530742, 'detail': 0.5065599869714308, 'electronic': 0.5803789952542556, 'equation': 0.44522309109716796, 'existing': 0.5244827852338209, 'failure': 0.5350426241138986, 'field': 0.4764218232028597, 'flow': 0.4259142395089385, 'forth': 0.601386387034237, 'from': 0.4294579273679228, 'full': 0.537349219481562, 'given': 0.44604683668675316, 'hypersonic': 0.4810398277066234, 'indicates': 0.5261850033081286, 'inviscid': 0.505080886641761, 'medium': 0.5500967190980623, 'method': 0.4405639827088214, 'number': 0.43268430502169697, 'numerical': 0.47685768011327184, 'others': 0.5766134289991359, 'plausible': 0.6093614982192016, 'predicting': 0.5424636184053723, 'problem': 0.45388333170426964, 'proposed': 0.5298538446768619, 'reason': 0.5803789952542556, 'result': 0.42780854179160943, 'section': 0.4846687214292022, 'set': 0.5102696660787975, 'shock': 0.463782790509387, 'shown': 0.4568884474899741, 'simpler': 0.5576488688530742, 'sized': 0.6589074142894036, 'solution': 0.44522309109716796, 'solving': 0.5468454037828238, 'supersonic': 0.46663083132077005, 'support': 0.5468454037828238, 'survey': 0.5279723669228994, 'than': 0.45935424055384644, 'that': 0.4275082590576167, 'treatment': 0.5289007262276136, 'using': 0.48079419221253034, 'various': 0.4793548101574117, 'wave': 0.468490059292712}

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5 326 0.01949390652440107 forst-order slip effects on the compressible laminar boundary layer over a slender body of revolution in axial flow .

Vector Representation for the Rank 5 With Document ID 326

{'analysis': 0.4766598175882614, 'boundary': 0.4660784246871832, 'case': 0.46175949870307836, 'compressible': 0.5258237592366958, 'considered': 0.48547423995698785, 'curvature': 0.555608918901094, 'effect': 0.4492681257057375, 'examined': 0.5586329042878203, 'first': 0.49693596710217247, 'flow': 0.4332428679364144, 'gradient': 0.5170422765262181, 'interaction': 0.5329761107031562, 'layer': 0.4745345466817294, 'no': 0.5072343362633125, 'only': 0.4892144505300779, 'order': 0.49205126195568033, 'pressure': 0.44462024628057123, 'slip': 0.6050119313641399, 'transverse': 0.5527721074754915, 'zero': 0.5086133021131177}

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Query No: 17

Query Vector for weight (Version 1) are:

[('about', 0.0318435982735854),

('body', 0.022257720023362428),

('can', 0.022257720023362428),

('dimensional', 0.06002841735252546),

('flow', 0.014518514035799977),

('potential', 0.0318435982735854),

('problem', 0.027778535891671244),

('reduced', 0.04142947652380837),

('revolution', 0.02623621896072643),

('three', 0.04142947652380837),

('to', 0.01665034071050346),

('transverse', 0.0318435982735854),

('two', 0.04142947652380837)]

Query Vector for weight (Version 2) are:

[('about', 0.035473182449981974),

('body', 0.03282215704191579),

('can', 0.03282215704191579),

('dimensional', 0.04447947454844006),

('flow', 0.03068183863021378),

('potential', 0.035473182449981974),

('problem', 0.034909657984752276),

('reduced', 0.03812420785804817),

('revolution', 0.03392243199780425),

('three', 0.03812420785804817),

('to', 0.031271406589738066),

('transverse', 0.035473182449981974),

('two', 0.03812420785804817)]

Ranks Document Number Scores Titles

1 298 0.08461739722942448 incompressible wedge flows of an electrically conducting viscous fluid in the presence of a magnetic field .

Vector Representation for the Rank 1 With Document ID 298

{'analyzed': 0.347529448406001, 'boundary': 0.11605826108957569, 'condition': 0.15012544924324459, 'conducting': 0.39499101025309524, 'differential': 0.27152672180814785, 'dimensional': 0.19765818558169257, 'discus': 0.4215225079418247, 'electrically': 0.43536512556343715, 'equation': 0.13117246567543026, 'field': 0.2216663818798242, 'flow': 0.0751659077259313, 'fluid': 0.23224019116896719, 'given': 0.13356179239887297, 'governing': 0.39499101025309524, 'magnetic': 0.3738847937284974, 'note': 0.3020292458501778, 'past': 0.32653464042795, 'presence': 0.32653464042795, 'purpose': 0.3020292458501778, 'to': 0.011748290985597008, 'two': 0.1270561673977648, 'viscous': 0.26369918285741484, 'wedge': 0.36856744140554065}

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2 320 0.06234046630196094 comment on improved numerical solution of the blasius problem with three-point boundary conditions .

Vector Representation for the Rank 2 With Document ID 320

{'accurate': 0.270211009225151, 'attention': 0.31403190967724753, 'drawn': 0.3891335228376759, 'previous': 0.2841526078838075, 'problem': 0.12933338923453824, 'solution': 0.10854665920362061, 'to': 0.014086267179562515}

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3 1276 0.06043185447234237 a three-dimensional linearized analysis of the forces exerted on a rigid wing by a shock wave .

Vector Representation for the Rank 3 With Document ID 1276

{'acoustic': 0.4082757719609241, 'author': 0.23833663006222613, 'by': 0.04331179236839078, 'dimensional': 0.163564324255595, 'distribution': 0.12607535993592625, 'edge': 0.17454918969413313, 'flat': 0.17692564250327128, 'found': 0.12660984428377786, 'front': 0.3214961336939525, 'ha': 0.11966097837637452, 'induced': 0.2716527987994464, 'moving': 0.31168150346321444, 'obliquely': 0.6214421478571256, 'on': 0.047578484797422, 'plate': 0.23002160078661651, 'pressure': 0.0834887895608359, 'shock': 0.15309455095854613, 'solution':

0.10854665920362061, 'striking': 0.4677370287671866, 'term': 0.1871501651331313, 'two': 0.1051403770694433}

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4 963 0.055582135591354394 a variational principle for convection of heat .

Vector Representation for the Rank 4 With Document ID 963

{'agreement': 0.17549188555788003, 'author': 0.23833663006222613, 'between': 0.1415028515150645, 'biot': 0.5025196342446008, 'case': 0.11555798590132785, 'convection': 0.3488145151546617, 'dimensional': 0.163564324255595, 'due': 0.19938423935311986, 'exact': 0.22302558106185744, 'excellent': 0.3891335228376759, 'extend': 0.3891335228376759, 'flowing': 0.4677370287671866, 'fluid': 0.1921813145342394, 'forced': 0.4677370287671866, 'given': 0.11052385336735143, 'heat': 0.14608784514803438, 'numerical': 0.1844775358789806, 'one': 0.14442207513234676, 'parabolic': 0.360269433606657, 'parallel': 0.26739815197031136, 'principle': 0.33559078227780864, 'problem': 0.12933338923453824, 'profile': 0.22139154193623733, 'result': 0.066747412341137, 'solution': 0.10854665920362061, 'to': 0.014086267179562515, 'transfer': 0.17501924270759028, 'uniform': 0.21219154199318402, 'variational': 0.37349316648351, 'various': 0.19047126866708147, 'velocity': 0.12988863039831225, 'wall': 0.18239781074082373}

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5 362 0.05390282586818881 three-dimensional effect of flutter in a real fluid .

Vector Representation for the Rank 5 With Document ID 362

{'account': 0.25106876010190277, 'accurate': 0.270211009225151, 'alternative': 0.42391612831509007, 'approximation': 0.19876034961904174, 'boundary': 0.09603948854195138, 'coefficient': 0.1579763843732755, 'determination': 0.28935325834839926, 'dimensional': 0.163564324255595, 'distribution': 0.12607535993592625, 'downwash': 0.37349316648351, 'effect': 0.09218542078944494, 'empirical': 0.48188590040174234, 'finite': 0.24661142193939375, 'fluid': 0.1921813145342394, 'flutter': 0.27924930419983346, 'following': 0.30080817680039457, 'formulation': 0.3325804923459027, 'given': 0.11052385336735143, 'governing': 0.32685940877657377, 'into': 0.1818856631878697, 'largeaspect': 0.6214421478571256, 'more':

0.1871501651331313, 'problem': 0.12933338923453824, 'ratio': 0.13475917316521085, 'real': 0.33559078227780864, 'rectangular': 0.27924930419983346, 'ref': 0.37839647016748407, 'reissners': 0.5271982855734489, 'semi': 0.3214961336939525, 'should': 0.27924930419983346, 'span': 0.3093937822796063, 'taken': 0.2716527987994464, 'three': 0.20322597653563415, 'value': 0.12905711054059832, 'vorticity': 0.32685940877657377, 'w': 0.4014093514806447, 'wing': 0.15953614480318243}

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Rankings Doc No Score Titles

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1 320 0.06741598445358553 comment on improved numerical solution of the blasius problem with three-point boundary conditions .

Vector Representation for the Rank 1 With Document ID 320

{'accurate': 0.5618011772797783, 'attention': 0.5880409419101723, 'drawn': 0.6330114612824701, 'previous': 0.5701493459299061, 'problem': 0.47744427105224063, 'solution': 0.4649972675032589, 'to': 0.4071860442032682}

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2 298 0.03677580881556507 incompressible wedge flows of an electrically conducting viscous fluid in the presence of a magnetic field .

Vector Representation for the Rank 2 With Document ID 298

{'analyzed': 0.5462533793827056, 'boundary': 0.44884165346989835, 'condition': 0.46317839936695343, 'conducting': 0.5662269782899543, 'differential': 0.514268591738897, 'dimensional': 0.48318195116001955, 'discus': 0.5773924240237153, 'electrically':

0.5832179148301757, 'equation': 0.4552022755912801, 'field': 0.4932854973705354, 'flow': 0.43163262298981697, 'fluid': 0.49773535147233444, 'given': 0.4562077935678306, 'governing': 0.5662269782899543, 'magnetic': 0.5573446936177807, 'note': 0.5271051937630151, 'past': 0.5374179795903583, 'presence': 0.5374179795903583, 'purpose': 0.5271051937630151, 'to': 0.4049441198911225, 'two': 0.4534699834462056, 'viscous': 0.5109744708261361, 'wedge': 0.555106953045959}

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3 963 0.035363889940787645 a variational principle for convection of heat .

Vector Representation for the Rank 3 With Document ID 963

{'agreement': 0.487829686468598, 'author': 0.5192820478610876, 'between': 0.47081895008120866, 'biot': 0.6514996165190841, 'case': 0.4578341365379475, 'convection': 0.5745737098005345, 'dimensional': 0.48186021405576007, 'due': 0.4997872646561127, 'exact': 0.5116192170188935, 'excellent': 0.594752453633999, 'extend': 0.594752453633999, 'flowing': 0.6340917157268012, 'fluid': 0.4961823650535581, 'forced': 0.6340917157268012, 'given': 0.4553146680126937, 'heat': 0.4731136348295325, 'numerical': 0.4923267995283265, 'one': 0.47227995492609115, 'parabolic': 0.5803066352458552, 'parallel': 0.5338266768014699, 'principle': 0.5679555330750047, 'problem': 0.46472841174553425, 'profile': 0.5108014177022788, 'result': 0.43340555764089034, 'solution': 0.4543251274254696, 'to': 0.40640895517970066, 'transfer': 0.4875931395010809, 'uniform': 0.5061970275452023, 'variational': 0.586924811971385, 'various': 0.4953265260962072, 'velocity': 0.4650062972852201, 'wall': 0.4912859445267148}

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4 577 0.033743556311717854 on hypersonic similitude .

Vector Representation for the Rank 4 With Document ID 577

{'about': 0.47514526522756684, 'around': 0.522857967999089, 'author': 0.4992966454442161, 'basic': 0.5308330791840536, 'body': 0.48126371410597973, 'by': 0.41804471133637644, 'certain': 0.48870815740532547, 'characterized': 0.5621221775166629, 'coordinate': 0.5308330791840536, 'dimension': 0.5500967190980623, 'dimensional': 0.4681447443000693, 'enlarges':

0.6589074142894036, 'essentially': 0.5289007262276136, 'fineness': 0.5576488688530742, 'flow': 0.4417293007066248, 'ha': 0.4498535778585301, 'hypersonic': 0.4810398277066234, 'indicating': 0.5948702467367286, 'inst': 0.6589074142894036, 'j': 0.5700972887016276, 'lengthwise': 0.6196432047718297, 'mach': 0.4468900171128598, 'mass': 0.5075811942652498, 'math': 0.6196432047718297, 'nonsteady': 0.5948702467367286, 'notion': 0.6589074142894036, 'number': 0.43268430502169697, 'on': 0.41982231574923745, 'out': 0.4866314009243353, 'paper': 0.4695464856737673, 'parameter': 0.5098925752845365, 'phys': 0.6341344562543025, 'pointed': 0.5361773169945373, 'problem': 0.45388333170426964, 'product': 0.5556060372191547, 'ratio': 0.4561438408970037, 'recent': 0.5170098812401128, 'replacing': 0.5845885401841006, 'same': 0.5108684947930934, 'similarity': 0.5663868301928643, 'slender': 0.5404819211314625, 'sonic': 0.5163418277015808, 'spatial': 0.601386387034237, 'tech': 0.6196432047718297, 'that': 0.4317052257512366, 'three': 0.4846687214292022, 'time': 0.4795907174410272, 'tsien': 0.5845885401841006, 'two': 0.44380395384884797}

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5 4 0.032516140939512564 approximate solutions of the incompressible laminar boundary layer equations for a plate in shear flow .

Vector Representation for the Rank 5 With Document ID 4

{'also': 0.45906254773108923, 'boundary': 0.46746486556073386, 'boundarylayer': 0.5540173964041313, 'by': 0.4196946014153241, 'comparison': 0.4924102741134845, 'considered': 0.4727231176144587, 'dimensional': 0.47437545286931415, 'distribution': 0.4573285894315401, 'effect': 0.4419182633521547, 'flat': 0.48045106929804743, 'flow': 0.4384558828363566, 'fluid': 0.4873880802953595, 'friction': 0.513138617476391, 'ha': 0.45441186211010576, 'incompressible': 0.49583146171751136, 'karman': 0.5473900361399046, 'layer': 0.4760984117783979, 'made': 0.4538538033956382, 'obtained': 0.4482865557910719, 'plate': 0.4721875352122385, 'pohlhausen': 0.5638205788543147, 'problem': 0.45881007022295706, 'shear': 0.5088266399646363, 'show': 0.48661049364022546, 'skin': 0.5074891041706984, 'solution': 0.4493579940030488, 'steady': 0.5049442254568258, 'technique': 0.5088266399646363, 'thickness': 0.4824749742166764, 'to': 0.4044206844250987, 'two': 0.4478091001505349, 'uniform': 0.49648706771850526, 'velocity': 0.45906254773108923, 'vorticity': 0.5486284778969602}

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Query No: 18

Query Vector for weight (Version 1) are:

[('angle', 0.047557468230641345),

('at', 0.047557468230641345),

('attack', 0.047557468230641345),

('available', 0.04034578360860959),

('body', 0.04034578360860959),

('distribution', 0.05772176682593947),

('experimental', 0.05772176682593947),

('on', 0.04034578360860959),

('pressure', 0.047557468230641345),

('revolution', 0.047557468230641345)]

Query Vector for weight (Version 2) are:

[('angle', 0.05343849494429004),

('at', 0.05343849494429004),

('attack', 0.05343849494429004),

('available', 0.051400661751341684),

('body', 0.051400661751341684),

('distribution', 0.05631065951416849),

('experimental', 0.05631065951416849),

('on', 0.051400661751341684),

('pressure', 0.05343849494429004),

('revolution', 0.05343849494429004)]

Ranks Document Number Scores Titles

1 492 0.04037831889810071 prediction of ogive-forebody pressures at angles of attack .

Vector Representation for the Rank 1 With Document ID 492

{'angle': 0.24798988319115764, 'approximate': 0.17432308885010464, 'approximation': 0.1840627411405065, 'arbitrary': 0.22541452260545322, 'at': 0.07160436566891452, 'attack': 0.3308475657709923, 'being': 0.21980459174508976, 'body': 0.12928678150606152, 'by': 0.04010904208165435, 'calculated': 0.1728098810037261, 'distribution': 0.11675254337477482, 'forebody': 0.41029581399344117, 'lower': 0.23798399737957068, 'method': 0.09016395214855977, 'not': 0.13528517773688292, 'obtaining': 0.4426294338386114, 'ogive': 0.3780852563019674, 'on': 0.044060228048051424, 'over': 0.13717671971690412, 'present': 0.14847120469611422, 'pressure': 0.12658246390336925, 'suggested': 0.2730836374538286, 'surface': 0.16194823636556005, 'utilizing': 0.35041542073362547, 'various': 0.17638660772417045, 'zero': 0.18819815110911567}

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2 1045 0.04033704738240432 the bending strength of pressurized cylinders .

Vector Representation for the Rank 2 With Document ID 1045

{'cylinder': 0.2216663818798242, 'data': 0.19422685815856466, 'discussion': 0.3182369617027767, 'experimental': 0.16108273106391074, 'loading': 0.2822233819620548, 'membrane': 0.5122785371621799, 'presented': 0.14981083400150466, 'pressurized': 0.47024573618458926, 'previously': 0.33368683078438854, 'term': 0.22616033318930492, 'theory': 0.12237131028024509}

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3 920 0.03946783384135691 supersonic flow over an inclined wing of zero aspect ratio .

Vector Representation for the Rank 3 With Document ID 920

{'approximation': 0.24019058098446416, 'asymptotic': 0.37948970696423406, 'at': 0.06750530221317826, 'distribution': 0.152354903827028, 'expression': 0.2868315024929699, 'found': 0.15300079777058181, 'incidence': 0.3355547307357344, 'laminar': 0.19617368800528992, 'lift': 0.24798866528445648, 'linearized': 0.3496669600635051, 'long': 0.3318519927509069, 'narrow': 0.5492534744193474, 'on': 0.05749589356104888, 'potential': 0.3318519927509069, 'stream': 0.18951397193648478, 'supersonic': 0.19326698423974895, 'theory': 0.12237131028024509, 'used': 0.17492534868552315, 'wing': 0.19279035975607345}

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4 161 0.0391522829155487 supersonic flow past a family of blunt symmetric bodies .

Vector Representation for the Rank 4 With Document ID 161

{'assumed': 0.26183128290606894, 'body': 0.16871131534354014, 'bow': 0.4215225079418247, 'carried': 0.32653464042795, 'computation': 0.3635095776851176, 'detached': 0.45727061854237766, 'emphasis': 0.5122785371621799, 'free': 0.20595586430686588, 'gas': 0.23434871760537254, 'mach': 0.13600749110761504, 'number': 0.09480291538170249, 'numerical': 0.22293061270158732, 'on': 0.05749589356104888, 'out': 0.2512799144964561, 'paraboloid': 0.6370891515767835, 'perfect': 0.40190461444533776, 'result': 0.08066045255080079, 'revolution': 0.3105545111488335, 'sphere': 0.37948970696423406, 'stream': 0.18951397193648478, 'summarized': 0.49337805582014427, 'taken': 0.3282769611482099, 'unyawed': 0.5354108567977349, 'wave': 0.1986597937849511}

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5 286 0.035784003389428484 effect of roll on dynamic instability of symmetric missiles .

Vector Representation for the Rank 5 With Document ID 286

{'attempt': 0.3854150706640581, 'by': 0.05233983836505397, 'certain': 0.25730367938315063, 'condition': 0.15012544924324459, 'describing': 0.49337805582014427, 'discussion': 0.3182369617027767, 'dynamic': 0.32147677670752695, 'experimental': 0.16108273106391074, 'extend': 0.47024573618458926, 'form': 0.19090547796463975, 'generalized': 0.37948970696423406, 'instability': 0.3885097972720185, 'neater': 0.7509775004326937, 'note': 0.3020292458501778, 'on':

0.05749589356104888, 'result': 0.08066045255080079, 'slightly': 0.3738847937284974, 'stability': 0.2811026613971851, 'stating': 0.6791219525543741, 'to': 0.011748290985597008}

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Rankings Doc No Score Titles

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1 492 0.03919904755695737 prediction of ogive-forebody pressures at angles of attack .

Vector Representation for the Rank 1 With Document ID 492

{'angle': 0.5184205210342274, 'approximate': 0.49084321407129006, 'approximation': 0.49591873977378437, 'arbitrary': 0.5174679720678466, 'at': 0.43594786105313904, 'attack': 0.55798685259796, 'being': 0.5145445259917428, 'body': 0.467373902369538, 'by': 0.4209016161889557, 'calculated': 0.49005465149343713, 'distribution': 0.4608420626385423, 'forebody': 0.613813274586994, 'lower': 0.5240181743112837, 'method': 0.44698622116309666, 'not': 0.4704997854437502, 'obtaining': 0.6222152411660515, 'ogive': 0.5970277150433683, 'on': 0.4229606574493451, 'over': 0.47148550543155776, 'present': 0.47737128524167577, 'pressure': 0.4604458582597847, 'suggested': 0.5423092919029, 'surface': 0.4813035999171965, 'utilizing': 0.5826084157271793, 'various': 0.49191855462458933, 'zero': 0.4980737838102857}

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2 1006 0.027047161161962038 free-flight measurements of the static and dynamic

Vector Representation for the Rank 2 With Document ID 1006

{'about': 0.4744884051223065, 'agreement': 0.4724749420481664, 'angle': 0.46754907717748584, 'at': 0.42306972947094496, 'attack': 0.4901183849383938, 'axisymmetric': 0.5210053855767273, 'blunt': 0.5523228468319531, 'body': 0.4932209679505402, 'calculated': 0.5079553115940145, 'characteristic':

0.474905203042763, 'computation': 0.524228280480996, 'computer': 0.5349869632642762, 'consisted': 0.5788022656299654, 'dimensional': 0.46754907717748584, 'distribution': 0.4520668199330752, 'experimental': 0.45504952805558946, 'field': 0.5061170551833518, 'flow': 0.44153271320790877, 'fuller': 0.5996260275094591, 'gas': 0.48008795368319085, 'good': 0.48260159025075333, 'ha': 0.44941779755619715, 'ibm': 0.5829750140681439, 'inviscid': 0.5041623531579635, 'method': 0.4402094046542866, 'nosed': 0.5455617981279144, 'number': 0.4323986048385664, 'numerically': 0.5361486219124023, 'on': 0.41964904484028376, 'over': 0.4611751603695952, 'perfect': 0.5373496662395262, 'pressure': 0.4344793445341236, 'region': 0.5040550924726668, 'result': 0.42756546165032505, 'shape': 0.4724749420481664, 'shock': 0.46322525211543875, 'showed': 0.525956789855898, 'solution': 0.44482778682499163, 'studied': 0.5093057764145827, 'subsonic': 0.4945740691670804, 'supersonic': 0.46604839762062406, 'surface': 0.4521770141575609, 'survey': 0.5268537343363642, 'transonic': 0.51666190227986, 'two': 0.44342105454509495, 'wave': 0.46789137370127715, 'were': 0.45528971483734393, 'zero': 0.48392861484894306}

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3 312 0.02623548526984735 chordwise pressure distributions over several naca 16 series airfoils at transonic mach numbers up to 1.25 .

Vector Representation for the Rank 3 With Document ID 312

{'airfoil': 0.5683265922960555, 'analysis': 0.4674973547750857, 'angle': 0.4769682041947859, 'apparatus': 0.5921216813451747, 'at': 0.426286601132576, 'attack': 0.5026846041940374, 'coefficient': 0.4743386962024534, 'design': 0.5001941916877859, 'dimensional': 0.4769682041947859, 'distribution': 0.4593270818171559, 'flow': 0.42926964505573084, 'from': 0.45054589326601535, 'investigation': 0.4771627465337168, 'langley': 0.5624932120850377, 'lift': 0.4965669201679364, 'mach': 0.4529613904771219, 'naca': 0.5593864905510157, 'number': 0.44963920519973183, 'over': 0.46970550052969695, 'photograph': 0.5757540859480952, 'presented': 0.4583364196533785, 'pressure': 0.4392871870570768, 'schlieren': 0.5658591156150347, 'series': 0.5135702366908754, 'several': 0.5019572429443755, 'test': 0.474704015050458, 'thickness': 0.48535007736521485, 'to': 0.40694985823016855, 'transonic': 0.5329293824819448, 'tunnel': 0.48440576630023113, 'two': 0.44947574019106973, 'wind': 0.49917217615761783, 'without': 0.5181450275443787, 'x': 0.5483665771179728}

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4 291 0.02552011051731639 sweepback effects in the turbulent boundary-layer shock-wave interaction .

Vector Representation for the Rank 4 With Document ID 291

{'ahead': 0.5703799144917274, 'angle': 0.4773534276876563, 'at': 0.4354648029543454, 'available': 0.5161180445549496, 'boundary': 0.44541933985849125, 'by': 0.4204831684063067, 'can': 0.4640105829070708, 'configuration': 0.517668659860385, 'dimensional': 0.4773534276876563, 'experiment': 0.49580184397612903, 'extension': 0.5385686042524664, 'influence': 0.511792941433094, 'interaction': 0.517668659860385, 'layer': 0.4512316981369061, 'moderate': 0.550831986596494, 'on': 0.42250098791417684, 'peak': 0.5703799144917274, 'pressure': 0.45300465969649684, 'reattachment': 0.5898359522115957, 'reported': 0.5572851609425697, 'rise': 0.5922869659676546, 'separation': 0.5442760084883067, 'shock': 0.47240202489658145, 'show': 0.4900783564782236, 'simple': 0.48299425281798625, 'sweep': 0.5723593068169193, 'sweptback': 0.6004799379479042, 'that': 0.4223498909235817, 'theory': 0.4478899483618625, 'turbulent': 0.4983382632910418, 'two': 0.449723364747835, 'understood': 0.628600569078889, 'upstream': 0.5485130986074713, 'wave': 0.4777454065348471}

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5 920 0.025514946578968235 supersonic flow over an inclined wing of zero aspect ratio .

Vector Representation for the Rank 5 With Document ID 920

{'approximation': 0.5062266658489722, 'asymptotic': 0.5678330854173734, 'at': 0.42985488919607967, 'distribution': 0.46738046676498457, 'expression': 0.5268540758151136, 'found': 0.46766611976534184, 'incidence': 0.5484024065798496, 'laminar': 0.4867597585162857, 'lift': 0.5096754459460194, 'linearized': 0.5546436799180499, 'long': 0.5467648339946614, 'narrow': 0.6429127947248894, 'on': 0.4254281289797649, 'potential': 0.5467648339946614, 'stream': 0.4838144330560182, 'supersonic': 0.48547423995698785, 'theory': 0.4541199252417034, 'used': 0.4773624697820017, 'wing': 0.48526344805351135}

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Query No: 19

Query Vector for weight (Version 1) are:

[('basic', 0.03848117788395965),

('combining', 0.05006516669551291),

('consideration', 0.05006516669551291),

('doe', 0.05006516669551291),

('dynamic', 0.05006516669551291),

('effect', 0.03848117788395965),

('entry', 0.05006516669551291),

('exist', 0.05006516669551291),

('good', 0.05006516669551291),

('re', 0.05006516669551291),

('realistic', 0.05006516669551291),

('relative', 0.05006516669551291),

('result', 0.05006516669551291),

('simplicity', 0.05006516669551291),

('treatment', 0.05006516669551291)]

Query Vector for weight (Version 2) are:

[('basic', 0.035473182449981974),

('combining', 0.03812420785804817),

('consideration', 0.03812420785804817),

('doe', 0.03812420785804817),

('dynamic', 0.03812420785804817),

('effect', 0.035473182449981974),

('entry', 0.03812420785804817),

('exist', 0.03812420785804817),

('good', 0.03812420785804817),

('re', 0.03812420785804817),

('realistic', 0.03812420785804817),

('relative', 0.03812420785804817),

('result', 0.03812420785804817),

('simplicity', 0.03812420785804817),

('treatment', 0.03812420785804817)]

Ranks Document Number Scores Titles

1 286 0.07515076560860234 effect of roll on dynamic instability of symmetric missiles .

Vector Representation for the Rank 1 With Document ID 286

{'attempt': 0.3854150706640581, 'by': 0.05233983836505397, 'certain': 0.25730367938315063, 'condition': 0.15012544924324459, 'describing': 0.49337805582014427, 'discussion': 0.3182369617027767, 'dynamic': 0.32147677670752695, 'experimental': 0.16108273106391074, 'extend': 0.47024573618458926, 'form': 0.19090547796463975, 'generalized': 0.37948970696423406, 'instability': 0.3885097972720185, 'neater': 0.7509775004326937, 'note': 0.3020292458501778, 'on': 0.05749589356104888, 'result': 0.08066045255080079, 'slightly': 0.3738847937284974, 'stability': 0.2811026613971851, 'stating': 0.6791219525543741, 'to': 0.011748290985597008}

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2 509 0.05510346445158705 a graphical approximation for temperatures and sublimation rates at surfaces subjected to small net and large gross heat transfer rates .

Vector Representation for the Rank 2 With Document ID 509

{'acted': 0.5271982855734489, 'at': 0.055861380633815266, 'by': 0.06275576151877217, 'change': 0.22302558106185744, 'condition': 0.1242304617275272, 'conduction': 0.3093937822796063, 'considers': 0.36885503908586875, 'derived': 0.19103750478445003, 'entry': 0.3164485331545604, 'heat': 0.14608784514803438, 'heated': 0.3524654687089807, 'heating': 0.2545706528709851, 'material': 0.26203487688769017, 'method': 0.09736364101196376, 'most': 0.23261554649289723, 're': 0.32685940877657377, 'severe': 0.3891335228376759, 'space': 0.36885503908586875, 'state': 0.2731192355396403, 'sublimation': 0.5271982855734489, 'such': 0.17789496875257943, 'suitable': 0.3049936147025652, 'surface': 0.12634218584411033, 'under': 0.18036731451851562, 'upon': 0.2545706528709851, 'vehicle': 0.2716527987994464}

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3 1146 0.05140111152014116 thermal buckling of cylinders .

Vector Representation for the Rank 3 With Document ID 1146

{'among': 0.5492534744193474, 'area': 0.3282769611482099, 'axial': 0.2746214484161083, 'both': 0.2038183526493618, 'buckling': 0.27357957389166593, 'circumferential': 0.4132248292166513, 'cylinder': 0.2216663818798242, 'difference': 0.31204612886278377, 'discussed': 0.19916425046207756, 'due': 0.24094451625367497, 'exist': 0.40190461444533776, 'experimental': 0.16108273106391074, 'future': 0.47024573618458926, 'indicated': 0.30479382682054995, 'investigation': 0.19815778000687356, 'on': 0.05749589356104888, 'result': 0.08066045255080079, 'reviewed': 0.4305425982496091, 'several': 0.26183128290606894, 'stress': 0.23154677291407538, 'that': 0.057109801336041384, 'theoretical': 0.20069251857152517, 'thermal': 0.2954241050090529, 'to': 0.011748290985597008, 'various': 0.23017369797185824, 'work': 0.28801626558942756}

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4 716 0.03237233521266626 study of the oscillatory motion of manned vehicles entering the earth's atmosphere .

Vector Representation for the Rank 4 With Document ID 716

{'aerodynamic': 0.18348915734933427, 'analysis': 0.13283120624992406, 'applied': 0.17743882191433544, 'arbitrarily': 0.39256906491107807, 'atmosphere': 0.26008475076950177,

'ballistic': 0.3336288129190638, 'behavior': 0.24762502642954715, 'comparable': 0.3299332158936935, 'consequence': 0.39256906491107807, 'continuous': 0.3107750585362357, 'damping': 0.28445171299870836, 'deceleration': 0.3658393706105376, 'deficiency': 0.44763337698537986, 'derived': 0.17691097273004497, 'doe': 0.27133761090628217, 'entry': 0.2930483094538725, 'expression': 0.21980459174508976, 'found': 0.11724750453956863, 'function': 0.16207720315867485, 'human': 0.44763337698537986, 'limit': 0.2615979586158803, 'made': 0.10967596759648604, 'may': 0.14279443242670897, 'missile': 0.3107750585362357, 'more': 0.17331108777644477, 'motion': 0.27675279470896497, 'oscillatory': 0.5592437010557056, 'prescribed': 0.32302094422766553, 'property': 0.20730119850254605, 're': 0.302689338503849, 'remain': 0.35041542073362547, 'result': 0.061811682778245364, 'serious': 0.41029581399344117, 'study': 0.17381547683570062, 'such': 0.16474027967078791, 'than': 0.13193016434126684, 'that': 0.060577628187355376, 'through': 0.18759403405361602, 'to': 0.009002945218177212, 'tolerance': 0.4331495683762693, 'trajectory': 0.5063865293673488, 'traverse': 0.42090368268483946, 'vehicle': 0.41186943515600627, 'within': 0.2042745082385507}

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5 1140 0.032358916237417615 shock-standoff distance for spherical bodies at high mach numbers .

Vector Representation for the Rank 5 With Document ID 1140

{'accurate': 0.32653464042795, 'almost': 0.4305425982496091, 'apropriate': 0.7509775004326937, 'behind': 0.3150953381735983, 'by': 0.05233983836505397, 'consideration': 0.2941521179759523, 'development': 0.303402320792395, 'distance': 0.25909106232649964, 'dyke': 0.5354108567977349, 'expression': 0.2868315024929699, 'give': 0.24558703719724512, 'hay': 0.7509775004326937, 'heat': 0.1765388542942732, 'method': 0.11765842405816515, 'prediction': 0.2993364803607412, 'ratio': 0.16284879835226998, 'shock': 0.18500605986439667, 'shockstandoff': 0.7509775004326937, 'simple': 0.2120719652133681, 'specific': 0.33368683078438854, 'sponsored': 0.6370891515767835, 'theory': 0.12237131028024509, 'those': 0.23796112640068073, 'usaf': 0.6370891515767835, 'van': 0.5023981461279287}

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Rankings Doc No Score Titles

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1 286 0.025596091820387117 effect of roll on dynamic instability of symmetric missiles .

Vector Representation for the Rank 1 With Document ID 286

{'attempt': 0.575414410967581, 'by': 0.42382149172611616, 'certain': 0.5171069239223595, 'condition': 0.46832677094041564, 'describing': 0.6245517304160044, 'discussion': 0.5448395598257829, 'dynamic': 0.5463141006104051, 'experimental': 0.4733137714047885, 'extend': 0.6140234907802441, 'form': 0.48688703301081027, 'generalized': 0.5727175932707989, 'instability': 0.576822917500825, 'neater': 0.7417932663124371, 'note': 0.5374629231921529, 'on': 0.426168173145614, 'result': 0.43671108591627966, 'slightly': 0.5701666225677666, 'stability': 0.527938582384565, 'stating': 0.7090895669368236, 'to': 0.40534701338887325}

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2 509 0.02240329151186158 a graphical approximation for temperatures and sublimation rates at surfaces subjected to small net and large gross heat transfer rates .

Vector Representation for the Rank 2 With Document ID 509

{'acted': 0.6725109590639371, 'at': 0.42887497707735966, 'by': 0.4291629329558567, 'change': 0.5152828388370986, 'condition': 0.4642152358926964, 'conduction': 0.5599269167685637, 'considers': 0.5906626846244781, 'derived': 0.4987480708313855, 'entry': 0.5635735464703271, 'heat': 0.4755134071530064, 'heated': 0.5821908483832174, 'heating': 0.5315886160136986, 'material': 0.5354469040641762, 'method': 0.45032766592036005, 'most': 0.5202399313552581, 're': 0.5689549708377533, 'severe': 0.6011447161613533, 'space': 0.5906626846244781, 'state': 0.5411764545758323, 'sublimation': 0.6725109590639371, 'such': 0.4919546399789279, 'suitable': 0.557652452076105, 'surface': 0.46530679476160014, 'under': 0.4932326056594879, 'upon': 0.5315886160136986, 'vehicle': 0.5404184474020378}

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3 1146 0.01868343041701715 thermal buckling of cylinders .

Vector Representation for the Rank 3 With Document ID 1146

{'among': 0.6349397893729108, 'area': 0.5404184474020378, 'axial': 0.5174676324375955, 'both': 0.48718204448756053, 'buckling': 0.5170219770294359, 'circumferential': 0.5767543745489275, 'cylinder': 0.49481642901750694, 'difference': 0.5334758089007223, 'discussed': 0.4851912809539179, 'due': 0.5030625322107244, 'exist': 0.5719122224317468, 'experimental': 0.46890214567650507, 'future': 0.6011447161613533, 'indicated': 0.530373681388334, 'investigation': 0.4847607694182272, 'on': 0.42459351420092595, 'result': 0.43450201157679064, 'reviewed': 0.5841619435466713, 'several': 0.5119967179492529, 'stress': 0.49904270540285517, 'that': 0.42442836563064573, 'theoretical': 0.4858449882210745, 'thermal': 0.5263658406164518, 'to': 0.40502525908018294, 'various': 0.49845538105673476, 'work': 0.5231971829492517}

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4 716 0.017746457707164844 study of the oscillatory motion of manned vehicles entering the earth's atmosphere .

Vector Representation for the Rank 4 With Document ID 716

{'aerodynamic': 0.48182859781231646, 'analysis': 0.4592372405550716, 'applied': 0.4791303977001564, 'arbitrarily': 0.5750696149582721, 'atmosphere': 0.5159870739790682, 'ballistic': 0.5487846930321831, 'behavior': 0.5104305507130891, 'comparable': 0.5471366091506398, 'consequence': 0.5750696149582721, 'continuous': 0.5385928609756788, 'damping': 0.5268537343363642, 'deceleration': 0.5631492735268658, 'deficiency': 0.5996260275094591, 'derived': 0.4788949987303708, 'doe': 0.5210053855767273, 'entry': 0.5306874618658071, 'expression': 0.4980237840482656, 'found': 0.45228755220233685, 'function': 0.4722797491873949, 'human': 0.5996260275094591, 'limit': 0.51666190227986, 'made': 0.4489109589458915, 'may': 0.463680428585965, 'missile': 0.5385928609756788, 'more': 0.47728959848605046, 'motion': 0.5249038301747843, 'oscillatory': 0.6462925857378359, 'prescribed': 0.5440540210222741, 'property': 0.4924477862524642, 're': 0.5349869632642762, 'remain': 0.5562708279043145, 'result': 0.42756546165032505, 'serious': 0.5829750140681439, 'study': 0.47751453520747317, 'such': 0.4734673714970785, 'than': 0.458835413019207, 'that': 0.4273398423725459, 'through': 0.48365920355358283, 'to': 0.4040149423215345, 'tolerance': 0.5931668461246482, 'trajectory': 0.6285419272221313, 'traverse': 0.587705686078053, 'vehicle': 0.581388521639961, 'within': 0.4910980072034307}

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5 1331 0.017698235263711944 calculated responses of a large sweptwing airplane to continuous turbulence with flight-test comparisons .

Vector Representation for the Rank 5 With Document ID 1331

{'aerodynamics': 0.5605616112916868, 'aeroelasticity': 0.6266381658300703, 'airplane': 0.5417233700165232, 'available': 0.5055523220926668, 'based': 0.4732667621367106, 'calculated': 0.5110138336994205, 'compare': 0.5626695008350584, 'connection': 0.5566761233237867, 'contribute': 0.6077999245549066, 'deformation': 0.528447179379483, 'degree': 0.5486850970028242, 'determined': 0.48571362908220084, 'dimensional': 0.47031494498166077, 'due': 0.48571362908220084, 'dynamic': 0.5143621843970072, 'effect': 0.4396297470149536, 'examined': 0.5275993712998417, 'extent': 0.5470006468283406, 'favorably': 0.590467117906214, 'five': 0.5531612719154015, 'flight': 0.4921690834058493, 'freedom': 0.6194322134047819, 'gust': 0.5755143645989503, 'lifting': 0.5405141460368108, 'load': 0.4924911642937627, 'motion': 0.492816082935304, 'on': 0.4204535955873463, 'one': 0.46208585101479344, 'process': 0.511007324681013, 'random': 0.5626695008350584, 'relative': 0.5311142227082268, 'response': 0.6516269724465271, 'result': 0.4286941583856709, 'shown': 0.4587001697113354, 'static': 0.5064859929055171, 'surface': 0.4543134567206057, 'symmetrical': 0.5484470293569195, 'test': 0.46824647610185444, 'theory': 0.44353238356593583, 'these': 0.44770486152115063, 'to': 0.4071571240393595, 'turbulence': 0.539343316675094, 'various': 0.48188201698546634, 'vertical': 0.528447179379483, 'wing': 0.4949082042066897}

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Query No: 20

Query Vector for weight (Version 1) are:

[('by', 0.03206764823663304),

('condition', 0.041720972246260764),

('convection', 0.041720972246260764),

('current', 0.041720972246260764),

('determined', 0.041720972246260764),

('flow', 0.014620665573615537),

('formally', 0.041720972246260764),

('free', 0.041720972246260764),

('general', 0.041720972246260764),

('ha', 0.041720972246260764),

('heating', 0.041720972246260764),

('induced', 0.041720972246260764),

('influence', 0.041720972246260764),

('joule', 0.041720972246260764),

('magnetohydrodynamic', 0.041720972246260764),

('produced', 0.041720972246260764),

('under', 0.041720972246260764)]

Query Vector for weight (Version 2) are:

[('by', 0.02880957617845637),

('condition', 0.030792567311338646),

('convection', 0.030792567311338646),

('current', 0.030792567311338646),

('determined', 0.030792567311338646),

('flow', 0.025225607394045006),

('formally', 0.030792567311338646),

('free', 0.030792567311338646),

('general', 0.030792567311338646),

('ha', 0.030792567311338646),

('heating', 0.030792567311338646),

('induced', 0.030792567311338646),

('influence', 0.030792567311338646),

('joule', 0.030792567311338646),

('magnetohydrodynamic', 0.030792567311338646),

('produced', 0.030792567311338646),

('under', 0.030792567311338646)]

Ranks Document Number Scores Titles

1 509 0.06670380244777907 a graphical approximation for temperatures and sublimation rates at surfaces subjected to small net and large gross heat transfer rates .

Vector Representation for the Rank 1 With Document ID 509

{'acted': 0.5271982855734489, 'at': 0.055861380633815266, 'by': 0.06275576151877217, 'change': 0.22302558106185744, 'condition': 0.1242304617275272, 'conduction': 0.3093937822796063, 'considers': 0.36885503908586875, 'derived': 0.19103750478445003, 'entry': 0.3164485331545604, 'heat': 0.14608784514803438, 'heated': 0.3524654687089807, 'heating': 0.2545706528709851, 'material': 0.26203487688769017, 'method': 0.09736364101196376, 'most': 0.23261554649289723, 're': 0.32685940877657377, 'severe': 0.3891335228376759, 'space': 0.36885503908586875, 'state': 0.2731192355396403, 'sublimation': 0.5271982855734489, 'such': 0.17789496875257943, 'suitable': 0.3049936147025652, 'surface': 0.12634218584411033, 'under': 0.18036731451851562, 'upon': 0.2545706528709851, 'vehicle': 0.2716527987994464}

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2 1276 0.04804878445943171 a three-dimensional linearized analysis of the forces exerted on a rigid wing by a shock wave .

Vector Representation for the Rank 2 With Document ID 1276

{'acoustic': 0.4082757719609241, 'author': 0.23833663006222613, 'by': 0.04331179236839078, 'dimensional': 0.163564324255595, 'distribution': 0.12607535993592625, 'edge':

0.17454918969413313, 'flat': 0.17692564250327128, 'found': 0.12660984428377786, 'front': 0.3214961336939525, 'ha': 0.11966097837637452, 'induced': 0.2716527987994464, 'moving': 0.31168150346321444, 'obliquely': 0.6214421478571256, 'on': 0.047578484797422, 'plate': 0.23002160078661651, 'pressure': 0.0834887895608359, 'shock': 0.15309455095854613, 'solution': 0.10854665920362061, 'striking': 0.4677370287671866, 'term': 0.1871501651331313, 'two': 0.1051403770694433}

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3 286 0.04573947230242199 effect of roll on dynamic instability of symmetric missiles .

Vector Representation for the Rank 3 With Document ID 286

{'attempt': 0.3854150706640581, 'by': 0.05233983836505397, 'certain': 0.25730367938315063, 'condition': 0.15012544924324459, 'describing': 0.49337805582014427, 'discussion': 0.3182369617027767, 'dynamic': 0.32147677670752695, 'experimental': 0.16108273106391074, 'extend': 0.47024573618458926, 'form': 0.19090547796463975, 'generalized': 0.37948970696423406, 'instability': 0.3885097972720185, 'neater': 0.7509775004326937, 'note': 0.3020292458501778, 'on': 0.05749589356104888, 'result': 0.08066045255080079, 'slightly': 0.3738847937284974, 'stability': 0.2811026613971851, 'stating': 0.6791219525543741, 'to': 0.011748290985597008}

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4 26 0.04531672344480748 inviscid leading-edge effect in hypersonic flow .

Vector Representation for the Rank 4 With Document ID 26

{'account': 0.25106876010190277, 'basis': 0.26074486069362346, 'blunt': 0.22812318711727908, 'current': 0.360269433606657, 'downstream': 0.25947395655495925, 'edge': 0.25290958241973427, 'effect': 0.09218542078944494, 'flow': 0.06220061601834868, 'give': 0.20322597653563415, 'ha': 0.11966097837637452, 'hypersonic': 0.2818397039595156, 'influence': 0.23638689930953372, 'interaction': 0.2488111440108371, 'interest': 0.29681748236510425, 'inviscid': 0.25222024665695203, 'leading': 0.31065164560888653, 'led': 0.4329544232897724, 'note': 0.2499325254733439, 'on': 0.047578484797422, 'perturbation': 0.3524654687089807, 'problem': 0.12933338923453824, 'purpose': 0.2499325254733439, 'realization': 0.6214421478571256, 'significant':

0.2746111768021922, 'small': 0.15419672192711542, 'theory': 0.10126360623697798, 'thickness': 0.1813765551041639, 'to': 0.014086267179562515, 'viscous': 0.2182139764355936}

==========

5 407 0.04227990014931493 stationary convection flow of an electrically conducting liquid between parallel plates in a magnetic field .

Vector Representation for the Rank 5 With Document ID 407

{'between': 0.1415028515150645, 'calculated': 0.1866089364588232, 'conducting': 0.32685940877657377, 'convection': 0.3488145151546617, 'convective': 0.360269433606657, 'different': 0.22139154193623733, 'distribution': 0.12607535993592625, 'electrically': 0.360269433606657, 'field': 0.26577924259061636, 'flow': 0.06220061601834868, 'found': 0.12660984428377786, 'heat': 0.14608784514803438, 'heated': 0.3524654687089807, 'induced': 0.2716527987994464, 'liquid': 0.3644548715088276, 'made': 0.118433711946317, 'magnetic': 0.3093937822796063, 'parallel': 0.26739815197031136, 'plate': 0.15875271962933116, 'presence': 0.270211009225151, 'space': 0.36885503908586875, 'stationary': 0.34194809467438225, 'study': 0.1876948302029902, 'temperature': 0.20783152798066645, 'to': 0.009721840107770649, 'two': 0.1051403770694433, 'velocity': 0.12988863039831225}

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Rankings Doc No Score Titles

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1 509 0.03311025836707379 a graphical approximation for temperatures and sublimation rates at surfaces subjected to small net and large gross heat transfer rates .

Vector Representation for the Rank 1 With Document ID 509

{'acted': 0.6725109590639371, 'at': 0.42887497707735966, 'by': 0.4291629329558567, 'change': 0.5152828388370986, 'condition': 0.4642152358926964, 'conduction': 0.5599269167685637, 'considers': 0.5906626846244781, 'derived': 0.4987480708313855, 'entry': 0.5635735464703271, 'heat': 0.4755134071530064, 'heated': 0.5821908483832174, 'heating': 0.5315886160136986, 'material': 0.5354469040641762, 'method': 0.45032766592036005, 'most': 0.5202399313552581, 're': 0.5689549708377533, 'severe': 0.6011447161613533, 'space': 0.5906626846244781, 'state': 0.5411764545758323, 'sublimation': 0.6725109590639371, 'such': 0.4919546399789279, 'suitable': 0.557652452076105, 'surface': 0.46530679476160014, 'under': 0.4932326056594879, 'upon': 0.5315886160136986, 'vehicle': 0.5404184474020378}

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2 1276 0.02588848497651098 a three-dimensional linearized analysis of the forces exerted on a rigid wing by a shock wave .

Vector Representation for the Rank 2 With Document ID 1276

{'acoustic': 0.6133739118018908, 'author': 0.5245599728776573, 'by': 0.422635696750772, 'dimensional': 0.48548231880139464, 'distribution': 0.4658897602523783, 'edge': 0.4912232514508652, 'flat': 0.4924652380367039, 'found': 0.466169093546025, 'front': 0.5680209612879695, 'ha': 0.46253746315530136, 'induced': 0.5419717365382082, 'moving': 0.5628916193356822, 'obliquely': 0.7247793554096444, 'on': 0.424865564199593, 'plate': 0.5076594122692809, 'pressure': 0.44363308049027567, 'shock': 0.4800105846513601, 'solution': 0.45672887513276195, 'striking': 0.6444496744034084, 'term': 0.49780879878575807, 'two': 0.4549486770568892}

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3 953 0.024551877582220365 vibrations of infinitely long cylindrical shells under initial stress .

Vector Representation for the Rank 3 With Document ID 953

{'applied': 0.4924668842782028, 'armenakas': 0.6712034817299548, 'bending': 0.5757574234421132, 'by': 0.4209016161889557, 'circumferential': 0.5650189807578765, 'cylindrical': 0.5154962525875045, 'dynamic': 0.5283799188208748, 'effect': 0.44448729037047574, 'general': 0.47913318023015866,

'herrmann': 0.6998985853014351, 'infinitely': 0.5738605819359809, 'influence': 0.5140767437985565, 'initial': 0.5546580254085055, 'investigation': 0.47913318023015866, 'long': 0.5325232022239244, 'moment': 0.5122567459463317, 'on': 0.4229606574493451, 'presented': 0.4598261028512745, 'radial': 0.5551491735910778, 'recently': 0.5504127814239155, 'response': 0.5780038653390304, 'shear': 0.5154962525875045, 'shell': 0.5527432462226276, 'stress': 0.5233030731976042, 'study': 0.49057868739732025, 'theory': 0.44886828541918167, 'to': 0.404691613056663, 'under': 0.48704253910881823, 'uniform': 0.5536266118925959}

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4 500 0.024021422373330947 joule heating in magnetohydrodynamic free-convection flows .

Vector Representation for the Rank 4 With Document ID 500

{'actual': 0.5251130773451756, 'alters': 0.5939673602440383, 'analytic': 0.5923708372866928, 'analyzed': 0.5110046088427009, 'between': 0.4546186312036147, 'conducting': 0.5261643374126537, 'confirms': 0.5939673602440383, 'constant': 0.4975743052743931, 'convection': 0.5346387804748364, 'description': 0.5251130773451756, 'developed': 0.4690440364888074, 'distributed': 0.5283726162580094, 'electrically': 0.539060260040076, 'energy': 0.48805318120974667, 'equation': 0.4418978832154194, 'estimating': 0.539060260040076, 'field': 0.5011622076570552, 'flow': 0.4343035741442479, 'fluid': 0.4741799916424583, 'free': 0.4657844975759737, 'fully': 0.5818139070805144, 'ha': 0.44618789499593314, 'heating': 0.5638087506294377, 'influence': 0.5303671257017999, 'joule': 0.7998798002868794, 'laminar': 0.4626599662334723, 'located': 0.5332870862324857, 'magnetic': 0.5194227869621569, 'magnitude': 0.4978049050861293, 'manner': 0.5048551592720173, 'negligibly': 0.5865786508712163, 'obtained': 0.4409883852914322, 'openended': 0.6398702155099468, 'plate': 0.46127690115900016, 'practice': 0.5480645049781299, 'present': 0.4618844762023408, 'qualitative': 0.5360480106323194, 'result': 0.4429500026811447, 'retained': 0.5939673602440383, 'small': 0.4595183333591467, 'steady': 0.4890826499563806, 'submerged': 0.603493063373699, 'such': 0.46866561053182226, 'temperature': 0.4791058623929029, 'term': 0.47223802022119576, 'that': 0.4182414790673669, 'transverse': 0.5103356585995314, 'two': 0.4405830936852431, 'uniformly': 0.5283726162580094, 'useful': 0.5185626889726742, 'usual': 0.5212130559715428, 'vertical': 0.5153296926751515, 'well': 0.4712064130838589}

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5 26 0.023109342468133016 inviscid leading-edge effect in hypersonic flow .

Vector Representation for the Rank 5 With Document ID 26

{'account': 0.5181450275443787, 'basis': 0.5226982948264851, 'blunt': 0.5073475657208144, 'current': 0.5695314149780343, 'downstream': 0.52210024748516, 'edge': 0.510445285929222, 'effect': 0.44337954699715976, 'flow': 0.42926964505573084, 'give': 0.4956317248939718, 'ha': 0.4563086764778146, 'hypersonic': 0.5230790324043773, 'influence': 0.5112362076377797, 'interaction': 0.517082664727295, 'interest': 0.5396729310944354, 'inviscid': 0.5186868807431123, 'leading': 0.5356611698749918, 'led': 0.6037346750916747, 'note': 0.5176103514204616, 'on': 0.4223889319986674, 'perturbation': 0.5658591156150347, 'problem': 0.4608602074878633, 'purpose': 0.5176103514204616, 'realization': 0.6924310441729925, 'significant': 0.5292233451669617, 'small': 0.47256010645027235, 'theory': 0.44765145429983033, 'thickness': 0.48535007736521485, 'to': 0.4061514545690097, 'viscous': 0.5026846041940374}

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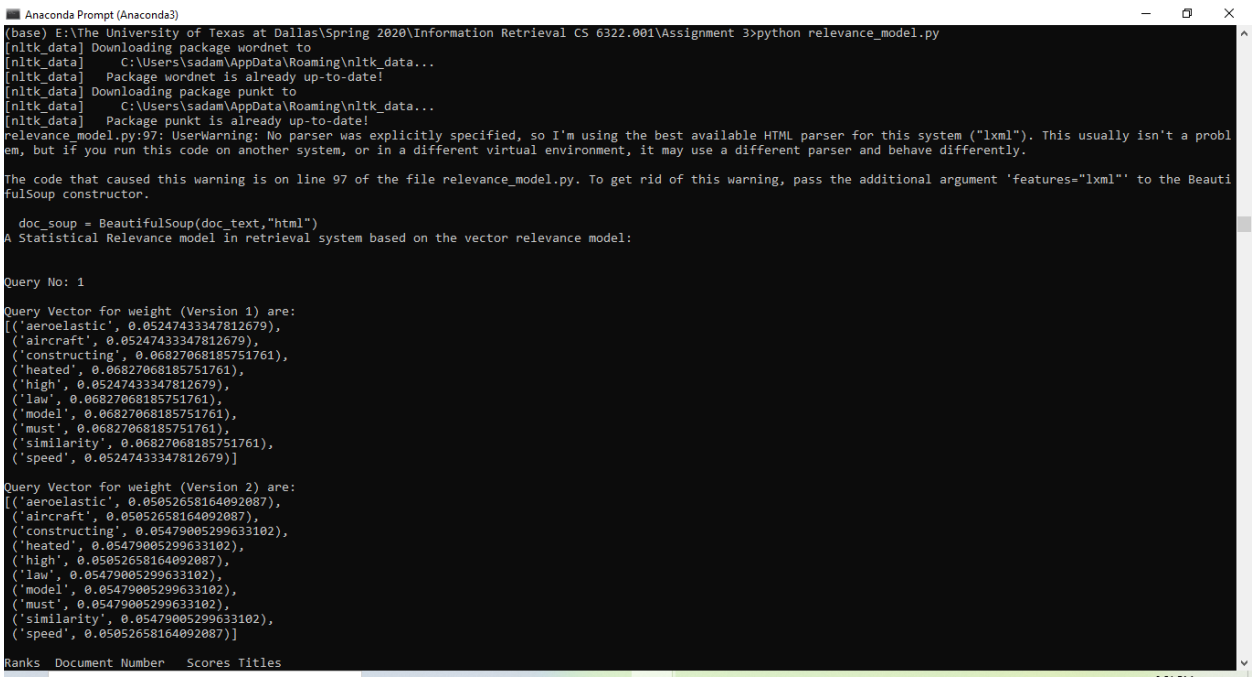
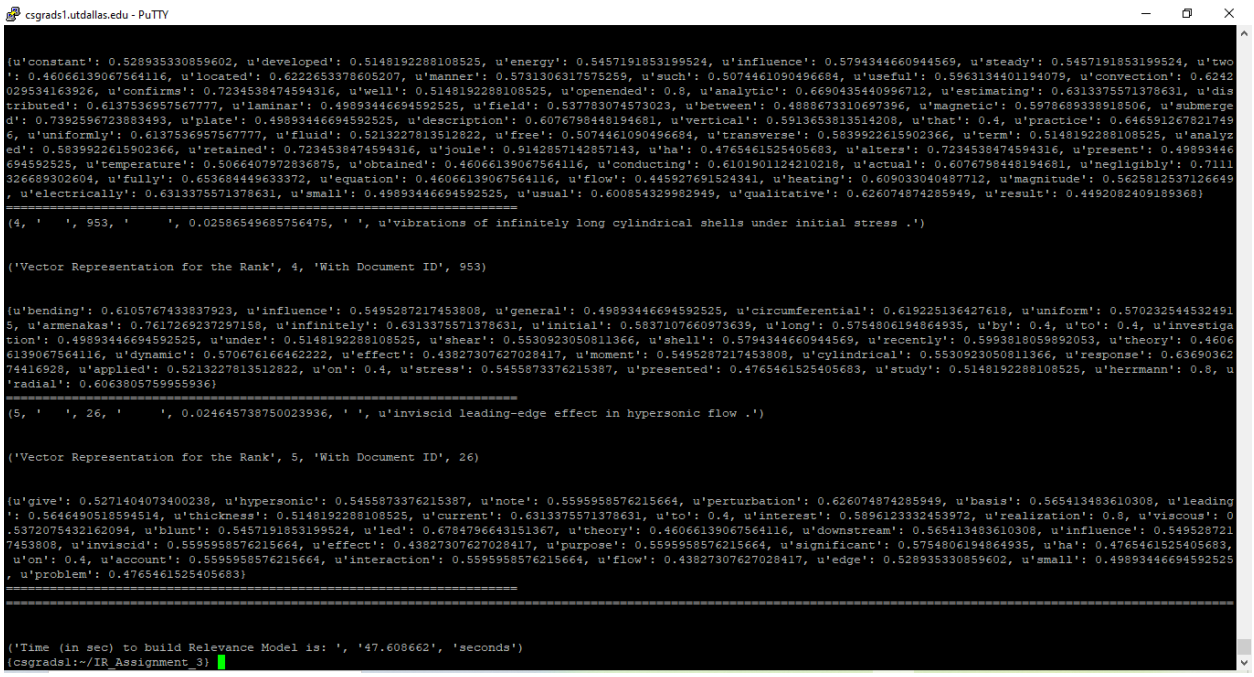
Time (in sec) to build Relevance Model is: 05.081913 seconds

Program Execution and Outputs Screenshots:



Screenshot of the Program Execution on CSgrads1 UTD Server using Putty!


csgrads1.utdallas.edu - PuTTY
{u'constant': 0.528935330859602, u'developed': 0.5148192288108525, u'energy': 0.5457191853199524, u'influence': 0.5794344660944569, u'steady': 0.5457191853199524, u'two': 0.46066139067564116, u'located': 0.6222653378605207, u'manner': 0.5731306317575259, u'such': 0.5074461090496684, u'useful': 0.5963134401194079, u'convection': 0.6242029534163926, u'confirms': 0.7234538474594316, u'well': 0.5148192288108525, u'openended': 0.8, u'analytic': 0.6690435440996712, u'estimating': 0.6313375571378631, u'distributed': 0.6137536957567777, u'laminar': 0.49893446694592525, u'field': 0.537783074573023, u'between': 0.4888673310697396, u'magnetic': 0.5978689338918506, u'submerged': 0.7392596723883493, u'plate': 0.49893446694592525, u'description': 0.6076798448194681, u'vertical': 0.5913653813514208, u'that': 0.4, u'practice': 0.6465912678217496, u'uniformly': 0.6137536957567777, u'fluid': 0.5213227813512822, u'free': 0.5074461090496684, u'transverse': 0.5839922615902366, u'term': 0.5148192288108525, u'analyzed': 0.5839922615902366, u'retained': 0.7234538474594316, u'joule': 0.9142857142857143, u'ha': 0.4765461525405683, u'alters': 0.7234538474594316, u'present': 0.49893446694592525, u'temperature': 0.5066407972836875, u'obtained': 0.46066139067564116, u'conducting': 0.6101901124210218, u'actual': 0.6076798448194681, u'negligibly': 0.7111326689302604, u'fully': 0.653684449633372, u'equation': 0.46066139067564116, u'flow': 0.445927691524341, u'heating': 0.609033040487712, u'magnitude': 0.5625812537126649, u'electrically': 0.6313375571378631, u'small': 0.49893446694592525, u'usual': 0.600854329982949, u'qualitative': 0.626074874285949, u'result': 0.4492082409189368}
(4, ' ', 953, '   ', 0.02586549685756475, ' ', u'vibrations of infinitely long cylindrical shells under initial stress .')
('Vector Representation for the Rank', 4, 'With Document ID', 953)
{u'bending': 0.6105767433837923, u'influence': 0.5495287217453808, u'general': 0.49893446694592525, u'circumferential': 0.619225136427618, u'uniform': 0.570232544532491, u'armenakas': 0.7617269237297158, u'infinitely': 0.6313375571378631, u'initial': 0.5837107660973639, u'long': 0.5754806194864935, u'by': 0.4, u'to': 0.4, u'investigation': 0.49893446694592525, u'under': 0.5148192288108525, u'shear': 0.5530923050811366, u'shell': 0.5794344660944569, u'recently': 0.5993818059892053, u'theory': 0.46066139067564116, u'dynamic': 0.570676166462222, u'effect': 0.43827307627028417, u'moment': 0.5495287217453808, u'cylindrical': 0.5530923050811366, u'response': 0.6369036274416928, u'applied': 0.5213227813512822, u'on': 0.4, u'stress': 0.5455873376215387, u'presented': 0.4765461525405683, u'study': 0.5148192288108525, u'herrmann': 0.8, u'radial': 0.6063805759955936}
(5, ' ', 26, '   ', 0.024645738750023936, ' ', u'inviscid leading-edge effect in hypersonic flow .')
('Vector Representation for the Rank', 5, 'With Document ID', 26)
{u'give': 0.5271404073400238, u'hypersonic': 0.5455873376215387, u'note': 0.5595958576215664, u'perturbation': 0.626074874285949, u'basis': 0.565413483610308, u'leading': 0.5646490518594514, u'thickness': 0.5148192288108525, u'current': 0.6313375571378631, u'to': 0.4, u'interest': 0.5896123332453972, u'realization': 0.8, u'viscous': 0.5372075432162094, u'blunt': 0.5457191853199524, u'led': 0.6784796643151367, u'theory': 0.46066139067564116, u'downstream': 0.565413483610308, u'influence': 0.5495287217453808, u'inviscid': 0.5595958576215664, u'effect': 0.43827307627028417, u'purpose': 0.5595958576215664, u'significant': 0.5754806194864935, u'ha': 0.4765461525405683, u'on': 0.4, u'account': 0.5595958576215664, u'interaction': 0.5595958576215664, u'flow': 0.43827307627028417, u'edge': 0.52893533085960 2, u'small': 0.49893446694592525, u'problem': 0.4765461525405683}
('Time (in sec) to build Relevance Model is: ', '47.608662', 'seconds')
{csgrads1:~/IR_Assignment_3}