

Description

Inspec®, a bibliographic database, comprises abstracts and specialized indexing of the world's quality research literature in the fields of physics and engineering from journals and serials, conference papers and proceedings, books and book chapters, and technical reports.

Some standards, dissertations and a small number of UK and US patents (published between 1968 and 1976) are included. All abstracts are in English; author-prepared abstracts are used when available.

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- **A – Physics:** elementary particles and fields, atomic, molecular and nuclear physics, phenomenology, fluids, plasmas and electric discharges, condensed matter: structure, thermal and mechanical properties, electronic structure: electrical, magnetic, and optical properties, cross-disciplinary physics and related areas, geophysics, astronomy and astrophysics.
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- **C – Computers and control:** management topics, systems and control theory and technology, numerical analysis and theoretical computer topics, computer hardware, software and applications.
- **D – Information technology for business:** management aspects, applications, systems and equipment, and office automation for communications and computing.
- **E – Mechanical and production engineering:** general topics in manufacturing and production engineering, manufacturing and production, engineering mechanics, and industrial sectors.

Date Coverage

1898–present
1898–1968
1969–present

Update Frequency

Weekly

Geographic Coverage

International

Document Types

- Reports
- Book Chapters
- Books and Monographs
- Conferences, Symposia, Meetings
- Journal Articles
- Theses and Dissertations
- Patents
- Standards

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An improved constrained differential evolution using discrete variables (D-ICDE) for layout optimization of truss structures

Ho-Huu, V.; Nguyen-Thoi, T.; Nguyen-Thoi, M. H.; Le-Anh, L.. **Expert Systems with Applications** 42.20 (Nov 15, 2015): 7057-69.

Highlighting: [Off](#) | [Single](#) | [Multi](#)

AB **Abstract (summary)** [Translate](#)

Recently, an improved ($\mu + \lambda$) constrained differential evolution (ICDE) has been proposed and proven to be robust and effective for solving constrained optimization problems. However, so far, the ICDE has been developed mainly for continuous design variables, and hence it becomes inappropriate for solving layout truss optimization problems which contain both discrete and continuous variables. This paper hence fills this gap by proposing a novel discrete variables handling technique and integrating it into original ICDE to give a so-called Discrete-ICDE (D-ICDE) for solving layout truss optimization problems. Objective functions of the optimization problems are minimum weights of the whole truss structures and constraints are stress, displacement and buckling limitations. Numerical examples of five classical truss problems are carried out and compared to other state-of-the-art optimization methods to illustrate the reliability and effectiveness of the proposed method. The D-ICDE's performance shows that it not only successfully handles discrete variables but also significantly improves the convergence of layout truss optimization problem. The D-ICDE is promising to extend for determining the optimal solution of other structural optimization problems which contain both discrete and continuous variables. [All rights reserved Elsevier].

RF **References**

C. Camp, B. Bichon, Design of space trusses using ant colony optimization. *Journal of Structural Engineering*. 130 (2004) 10.1061/(ASCE)0733-9445(2004)130:5(741)

T. Y. Chen, H. C. Chen, Mixed-discrete structural optimization using a rank-niche evolution strategy. *Engineering Optimization*. 41 (2008) 10.1080/03052150802344535

T. Y. Chen, H. C. Chen, Mixed-discrete structural optimization using a rank-niche evolution strategy. *Engineering Optimization*. (2009)

D. Datta, J. R. Figueira, A real-integer-discrete-coded particle swarm optimization for design problems. *Applied Soft Computing*. 11 (2011) 10.1016/j.asoc.2011.01.034

Indexing (details) [Cite](#)

| | | |
|-----------------|---------------------------|---|
| SU, SUBT | Subject | buckling; evolutionary computation; optimisation; structural engineering; supports |
| CC | Classification | E2110A: General shapes and structures (major); E2180C: Buckling and instability (mechanical engineering); E0210G: Optimisation |
| IPC | IPC classification | E04C 3/00: Structural elongated elements designed for load-supporting; F16M: Frames, casings, or beds, of engines or other machines or apparatus, not specific to an engine, machine, or apparatus provided for elsewhere; Stands or supports |

| | | |
|---------------|-----------------------------|---|
| IF | Identifier (keyword) | discrete variables, layout optimization, truss structures, improved constrained differential evolution, D-ICDE, discrete variables handling technique, stress, displacement, buckling |
| TI | Title | An improved constrained differential evolution using discrete variables (D-ICDE) for layout optimization of truss structures |
| AU | Author | Ho-Huu, V. ¹ ; Nguyen-Thoi, T. ¹ ; Nguyen-Thoi, M. H. ¹ ; Le-Anh, L. ¹ |
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| LA | Language | English |
| SL | Language of abstract | English |
| DTX | Document treatment | P, Practical, T, Theoretical or Mathematical |
| DTYPE | Document type | Journal Paper |
| PUB | Publication title | Expert Systems with Applications |
| VO | Volume | 42 |
| ISS | Issue | 20 |
| PG | Pagination | 7057-69 |
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| CODEN | CODEN | ESAPEH |
| PSTYPE | Publication type | Journal Paper |
| PB | Publisher | Elsevier B.V. |
| PBLOC | Publisher location | Netherlands |
| FSU | Subfile | Mechanical and Production Engineering |
| DOI | DOI | http://dx.doi.org/10.1016/j.eswa.2015.04.072 |
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| AN | Accession number | 15204281 |
| | Document URL | http://search.proquest.com/professional/docview/1691037759?accountid=137296 |
| | Copyright | 2015 The Institution of Engineering and Technology |
| FAV | First available | 2015-06-25 |
| UD | Updates | 2015-06-25 |
| | Database | Inspec® (1898 - current) |

SEARCH FIELDS

| Field Name | Field Code | Example | Description and Notes |
|------------------|------------|---|---|
| Abstract | AB | ab("truss optimization" PRE/6 "continuous variables") | Use adjacency and/or Boolean operators to narrow search results. |
| Abstract present | ABANY | "evolutionary computing " AND abany(yes) | Add: <i>AND ABANY(YES)</i> to a query to limit retrieval to records with abstracts. |
| Accession number | AN | an(15204281) | A unique document identification number assigned by the information provider. |

| | | | |
|------------------------------|-----|--|---|
| All fields + text | -- | icde N/10 optimization nguyen AND "ho-huu" | Same as ALL field code: searches all fields in bibliographic files. |
| Astronomical object indexing | ASI | asi("ngc 3393") asi(3393) asi("iras 18264-1152" OR "iras 05358+3543") asi("18264-1152" OR "05358+3543") | Available in some records added since 1995. |
| Author ¹ | AU | au("nguyen thoi, t") | Includes all Author names. |
| First author | FAU | fau("ho huu, v") | First name listed in Author field. It is included in Author <i>Browse field</i> , but its position cannot be specified there. |
| Author affiliation | AF | af("ton duc thang" AND vietnam) | Includes as much data as is available in the original document, such as organization, department, address, city, state, country, author email, etc. |
| Chemical indexing | CI | ci("si-al-au int") ci("ce - el") ci("si - int" AND "si - el") ci(fe AND si) ci(gaas bin) | Displays with label Substance. Available in some records added since 1987; CI searches both the substance(s) and/or role(s). Refer to <i>Chemical Indexing Roles</i> below. See also Substance. |
| Cited references | RF | rf("d data" LNK "applied soft computing" LNK 2011) rf(camp AND chen AND data) rf((datta LNK "applied soft computing" LNK 2011) AND (chen LNK "engineering optimization" LNK 2008)) | Cited reference data is present in fewer than 10% of records in Inspec. References are displayed in the Abstract field. The content of references differ based on the type of work cited. For a journal reference, the cited author name(s), article title, publication title, volume, publication year, and DOI are typically given. Use LNK to explicitly search multiple parts of the same reference. Use AND if you want to search for multiple references within a single record. |

| | | | |
|-----------------------------------|-------------|--|---|
| Number of cited references | NR | nr(31) | |
| Classification ¹ | CC | cc(E2180*) cc("buckling and instability") | Also searchable using field code INSPCC. |
| Major classification ¹ | MJCC | mjcc("general shapes") mjcc(E2110A) | Displays in Classification field. |
| Classification (IPC) ¹ | IPC | ipc(E04C 3/00) ipc(F16M) ipc(E04C 3/00: Structural elongated elements) | Available in records added since 1969. See below for more information. |
| CODEN | CD | cd(esapeh) | |
| Conference information | CF | cf("xii international scientific colloquium") | |
| Conference country | CNT | cnt(brazil) | |
| Conference event end date | EVDT | evdt(20110805) | Range searching is NOT supported for conference dates. |
| Conference event start date | ESDT CDT | cdt(20110731) | Range searching is NOT supported for conference dates. |
| Conference location | CG | cg("san jose, ca") | |
| Conference title | CFTI | cfti(2011 AND "neural networks") | |
| Digital object identifier | DOI | doi("10.1016/j.eswa.2015.04.072") | Search the portion of the DOI that comes after http://dx.doi.org/ . Video presentations at the IET Web site are linked from some documents. To locate them, add the query: doi(iet.tv) to your search. |
| Document title | TI | ti(optimization AND "truss structure*") | Includes Title, Alternate title and Subtitle, but not Publication title (PUB). |
| Title only | TIO | tio("truss structure*") | Searches only the Title, not Subtitle or Alternate title. |
| Document treatment | DTX | dtx(p) dtx(practical) dtx(x AND t) dtx(experimental AND theoretical) | First used in 1971. Multiple treatment codes may apply to a single document. |
| Document type | DTYPE | dtype(journal PRE/1 paper*) dtype("conference paper") dtype(report NOT "report section") | |

| | | | |
|------------------------------------|------|--|--|
| Editor | ED | ed("smith, j*") | |
| First available | FAV | fav(20131212) | Indicates the first time a document was loaded in a specific database on PQD. It will not change regardless of how many times the record is subsequently reloaded - as long as the accession number does not change. |
| From database ² | FDB | su("structural engineering") AND fdb(inspec) su("structural engineering") AND fdb(10000135) | Useful in multi-file searches to isolate records from a single file. FDB cannot be searched on its own; specify at least one search term then AND it with FDB. |
| Identifier (keyword) | IF | if("constrained differential evolution") | |
| Images | | signal* AND ftany(yes) | A small number of images are present in records from 1897 to 1968. Records with images can be identified by adding <i>AND FTANY(YES)</i> to the query. |
| ISBN | ISBN | isbn(9783642135941) | |
| ISSN | ISSN | issn(0957-4174) issn(09574174) | Also searchable in the <i>Look Up Citation</i> tool. |
| Issue | ISS | iss(20) | Also searchable in the <i>Look Up Citation</i> tool. |
| Language | LA | la(french) | LA searches for language of original publication; all Inspec abstracts are in English. |
| Numeric indexing | | | Refer to the separate <i>Numeric Indexing</i> section, below. |
| Pagination | PG | pg(7057-69) pg(7057) | Page ranges can be searched, but we recommend that you should search only the start page). Also searchable in the <i>Look Up Citation</i> tool. |
| Patent information | PAT | pat(otis N/1 elevator and 1975) | Patent information is only available between the years 1906- 1976. |
| Inventor | INV | inv(Goodwin, e. c.) | |
| Patent application date | PAD | pad(1973-02-05) | |
| Patent assignee | AP | ap("lucas elec co. ltd.") | |
| Patent priority application number | APN | apn(2310718) | |
| Patent priority date | PRD | prd(19750525) prd(>19751231) | Date range searching is supported. |

| | | | |
|--------------------------------|-------|--|--|
| Patent publication date | PDA | pda(19760128) | Date range searching is supported. |
| Patent publication number | PN | pn(1422775) | |
| Patent publication country | PC | pc(gb) pc(us) | |
| Publication date | PD | pd(20151115) pd(20150701-20151231) | Date range searching is supported. |
| Publication year | YR | yr(2015) yr(2013-2015) | Date range searching is supported. |
| Publication title ¹ | PUB | pub("expert systems with applications") pub(nature) | |
| Publisher location | PBLOC | pbloc(netehrlands) | |
| Publisher name | PB | pb(elsevier) pb("wuhan university") | For dissertation-type records the publisher name field contains the university name. |
| Report number | RP | rp(iet-tv.44.9563) | |
| Subfile | FSU | fsu("electrical and electronic engineering") fsu("information technology for business") fsu("mechanical and production engineering") fsu("computing and control engineering") fsu("physics") | You can also select these from the list of subfiles on the Advanced Search page. A record may appear in more than one subfile. |
| Subject ¹ | SU | su("mechanical engineering") | SU retrieves data from multiple fields including <i>Subject</i> , <i>Identifier (keyword)</i> , <i>Classification (text only)</i> |
| Main subject | SUBT | subt("evolutionary computation") | SUBT searches terms from the <i>Subject</i> display field only. Terms selected from the Subject filter use the SUBT field code. |
| Substance | SUBST | subst("si-al-au int") subst("ce - el") subst("si - int" and "si - el") subst(fe and si) subst(gaas bin) | Available in some records from January 1987 onwards. |

| | | | |
|------------------|-----|---|---|
| | | | Chemical indexing is structured to search both the substance(s) and/or role(s). Refer to “ <i>Chemical Indexing Roles</i> ” below. See also Chemical Indexing, CI. |
| Summary Language | SL | sl(english) | Language of abstract. All abstracts are in English. |
| URL | URL | url(http://www.dlib.org/dlib/december02/rauber/12rauber.html) av(http://www.dlib.org/dlib/december02/rauber/12rauber.html) | Also searchable using field code AV. |
| Updated | UD | ud(2013-12-12) | The date(s) the record was loaded as a result of an update provided by the supplier. |
| Volume | VO | vo(42) | Also searchable on the Look Up Citation page. |

¹ A Lookup/Browse feature is available for this field in the Advanced Search dropdown or in Browse Fields.

² Click the “Field codes” hyperlink at the top right of the Advanced Search page. Click “Search syntax and field codes”, then click on “FDB command” to get a list of database names and codes that can be searched with FDB.

SEARCH TOOLS

In addition to [Search Fields](#), other tools available for searching are [Limit options](#), [Browse Fields](#), “[Narrow results by Filters](#)”, and [Look Up Citation](#). Each is listed separately below. Some data can be searched using more than one tool.

LIMIT OPTIONS

Limit options are quick and easy ways of searching certain common concepts. Limit check boxes are available for:

Abstract included

Short lists of choices are available for:

Document type, Language, Document treatment, Subfile

Date limiters are available in which you can select single dates or ranges for date of **publication** and **updated**.

BROWSE FIELDS

You can browse the contents of certain fields by using Look up lists. These are particularly useful to validate spellings or the presence of specific data. Terms found in the course of browsing may be selected and automatically added to the Advanced Search form. Look up lists are available in the fields drop-down:

Author, Classifications, Major Classifications

and in the fields drop-down only for:

Authors, Publication title

THESAURUS

The Inspec Thesaurus is available by clicking on the “Thesaurus” hyperlink on the right-hand side of the Advanced and the Command Line search pages. Thesaurus terms may be searched within the thesaurus, then selected to be added automatically to the search form.

“NARROW RESULTS BY” FILTERS

When results of a search are presented, the results display is accompanied by a list of “Narrow results by” options shown on the right-hand panel. Click on any of these options and you will see a ranked list showing the most frequently occurring terms in your results. Click on the term to apply it to (“narrow”) your search results. “Narrow results by” filters in Inspec include:

Author, Classification, Classification (IPC), Document type, Language, Publication date, Publication title, Source type, and Subject

LOOK UP CITATION

If you need to trace a particular bibliographic reference, use the Look Up Citation feature. Find a link to this toward the top left of the Advanced Search page, or in the drop list under Advanced on any search form; click this and you will go to a form where you can enter any known details of the citation, including document title, author, journal name, volume, issue, page, publication date, ISSN.

INTERNATIONAL PATENT CLASSIFICATION (IPC)

IPC classification codes may be applied to ALL record types – not just patent records. Searching with IPC codes is an ideal way to link the non-patent literature content of Inspec with PQD's patent collection. Finding research and prior art relating to filed patents is simplified by the presence of IPC codes in Inspec records. Note that IPC codes are mapped to Inspec's own classification coding system; since IPC coding is very precise, there may not always be a one-to-one match, so you should use broader IPC codes to ensure accurate retrieval.

The following is a link to WIPO's own IPC classification look-up. It is arranged hierarchically. Use this tool to find appropriate codes for searching: <http://web2.wipo.int/ipcpub/>.

CHEMICAL INDEXING ROLES

Chemical indexing is displayed in the Substance field and is searchable with the SUBST and CI field codes. The following roles are also searchable:

| | |
|-----|--|
| ADS | Adsorbate or any sorbate (i.e., any species being (ad)sorbed onto a substrate) |
| BIN | Binary system (2 elements, whether compound or alloy, and regardless of the relative proportions of the two) |
| DOP | Dopant |
| EL | Element |
| INT | Interface system |
| SS | System with three or more components |
| SUR | Surface or substrate |

Roles can be searched on their own – e.g. SUBST(INT), or in combination with an element or molecule – e.g. SUBST("H2SO4 – SS")

NUMERIC INDEXING

Numeric data, such as temperature, pressure, frequency, etc., are indexed for many records added to Inspec since February 1987.

Values are presented in floating point format, e.g. 1.8E+04 for 18000 and 9.5E-01 for 0.95.

For search purposes, do NOT use the '+' sign, and leading zeroes are optional – ie. to retrieve the specific displayed value of '1.8E+04' search as '1.8E4' or '18000'.

However, you MUST use the '-' symbol to retrieve decimal values – ie. to retrieve the specific displayed value of '9.5E-01' search as '0.95' or '9.5E-1'.

When searching **ranges**, use a hyphen (dash) between the values searched WITHOUT a space either side of the hyphen:

NIDI(5-50) or NIDI(5E0-5E1) to retrieve any records with a Distance numeric value between **5m - 50m**.

NICD(0.0000001-0.0001) or NICD(1.0E-7-1.0E-4) to retrieve any records with a Conductance numeric value between **0.0000001 Siemens - 0.0001 Siemens**.

Refer to the table below for examples of numeric searching.

| Field and SI unit | Field Code | Example |
|-------------------------------|------------|---|
| Numeric indexing type | nitype | nitype(altitude), nitype("apparent power"), nitype("galactic distance"), nitype("electron volt energy"), nitype(mass not "stellar mass"), nitype(resistivity), etc. |
| Age (yr; Year) | niag | niag(2-5) |
| Altitude (m; Meter) | nial | nial(2E4-9E5) |
| Apparent power (VA; Volt-amp) | niap | niap(3E6) |

| Field and SI unit | Field Code | Example |
|--|------------|----------------------------|
| Bandwidth (Hz; Hertz) | nibw | nibw(4.0E8) |
| Bit rate (Bit/s; Bits per Second) | nibi | nibi(64000) |
| Byte rate (Byte/s; Bytes per Second) | niby | niby(10E6) |
| Capacitance (F; Farad) | nica | nica(3.0E-11) |
| Computer execution rate (IPS; Instructions/Second) | nice | nice(1E7) |
| Computer speed (FLOPS) | nicm | nicm(1.5E10) |
| Conductance (S; Siemens) | nicd | nicd(1.0E-7-1.0E-4) |
| Current (A; Ampere) | nicu | nicu(5.6E-3) |
| Depth (m; Meter) | nidp | nidp(2E4-9E5) |
| Distance (m; Meter) | nidi | nidi(0.002), nidi(2E-3) |
| Efficiency (Percent) | nief | nief(1.0E1), nief(10) |
| Electrical conductivity (S/m; Siemens per Meter) | niel | niel(1.0E1) |
| Electron volt energy (eV; Electron Volt) | niev | niev(1.07-1.82) |
| Energy (J; Joule) | nien | nien(0.5) |
| Frequency (Hz; Hertz) | nifr | nifr(5.2E9) |
| Gain (dB; Decibel) | niga | niga(2.03E1) |
| Galactic distance (pc; Parsec) | nigd | nigd(1.2E5) |
| Geocentric distance (m; Meter) | nige | nige(3E7) |
| Heliocentric distance (AU; Astronomical Unit) | nihd | nihd(5E1) |
| Loss (dB; Decibel) | nils | nils(1.5E1) |
| Magnetic flux density (T; Tesla) | nimd | nimd(1E-2) |
| Mass (kg; Kilogram) | nima | nima(2.4E-3-2.42E-1) |
| Memory size (Byte) | nims | nims(>=3E7) |
| Noise figure (dB; Decibel) | ninf | ninf(5-7) |
| Picture size (pixel; Picture Element) | nipx | nipx(1.28E2) |
| Power (W; Watt) | nipo | nipo(5.0E2), nipo(500) |
| Pressure (Pa; Pascal) | nipr | nipr(1.3E-3), nipr(0.0013) |
| Printer speed (cps; Characters per Second) | nips | nips(2.7E2) |
| Radiation absorbed dose (Gy; Gray) | nira | nira(2) |
| Radiation dose equivalent (Sv; Sievert) | nird | nird(1.0E-3) |
| Radiation exposure (C/kg; Coulomb per Kilogram) | nirx | nirx(<=0.1) |
| Radioactivity (Bq; Becquerel) | niry | niry(4.0E4) |
| Reactive power (VAr; Volt-Amp Reactive) | nirp | nirp(<=3.0E8) |
| Resistance (ohm) | nire | nire(7E-5) |
| Resistivity, electrical (ohmm; Ohm meter) | nier | nier(5.0E-3), nier(0.005) |
| Size (m; Meter) | nisi | nisi(1.0E-6) |
| Stellar mass, Msol; Solar Mass) | nism | nism(1.1E1), nism(11) |
| Storage capacity (Bit) | nisr | nisr(1.0E6) |
| Temperature (K; Kelvin) | nite | nite(3.26E2) |
| Time (s; Second) | nitm | nitm(1.35E-1) |
| Velocity (m/s; Meters per Second) | nive | nive(1.0E4) |
| Voltage (V; Volt) | nivo | nivo(>=10000) |
| Wavelength (m; Meter) | niwa | niwa(1.1E-6) |
| Word length (Bit) | niwl | niwl(32-128) |

DOCUMENT FORMATS

| Document Format | Fields | Online | Export / Download |
|----------------------------------|---|----------------|-------------------|
| Brief view | Title and Publication date. | ✓ | |
| Detailed view | Same as Brief view plus a 3-line KWIC window. | ✓ | |
| KWIC (Keyword in Context) | Detailed view plus all occurrences of your search terms, highlighted within the fields where the terms occur. | ✓ | ✓ |
| Preview | Title, Author, Publication title, Publisher, Volume, Issue, Pagination, Publication date, Abstract. | ✓ | |
| Brief citation | Complete record minus Abstract and Indexing | ✓ | ✓ |
| Citation / Abstract | Complete record | ✓ ¹ | ✓ |
| Custom | Choose the fields you want. | | ✓ ² |

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