

IEEE *Xplore* 2.0 User Guide

Searching IEEE *Xplore*

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Searching IEEE *Xplore*

Searching IEEE *Xplore* General Procedure

Use the following general procedure to search the IEEE *Xplore* collections.

Quick Searching

1. On the Home page, enter a keyword in the **Basic Search** box and click .

Basic Search



Basic Search is available to everyone visiting IEEE *Xplore*.

or

You can perform a quick search on a publication page or table of contents page for a publication. Enter a keyword in the **Search This Publication**, **Search this issue**, or **Search this Conference Proceeding** box and click . You need to be logged in to IEEE *Xplore* to perform searching within publications.

More Advanced Searching

You need to be logged in to your institution's subscription account to access advanced searching functions. IEEE members must be logged in to IEEE *Xplore* with their IEEE Web Account username and password.

1. Select **Advanced** or **Author** under **SEARCH**.
2. Enter a keyword, phrase, author name, or search query in the text box(es).
3. Select additional search options (Advanced search).
4. Click **Run Search** or . IEEE *Xplore* returns a list of results. The Subscriber icon  indicates the articles where you have access to full text.

Revising Search Results

5. You can refine your search by modifying or replacing your search query and clicking .

Searching within Search Results

6. To search for a subset of results within your current results set, enter one or more keywords, click the checkbox next to **Check to search only within this results set**, and click .

Selecting a Result

7. View multiple pages of results by clicking the result-range page links, such as [26-50](#).

- Click [Abstract](#) or [AbstractPlus](#) to view an article's Abstract, or [PDF](#) to view the full text.

Note: You can view full text if you or your institution subscribes to the publication. You can view the AbstractPlus if you are an IEEE member or your institution subscribes to the publication. All visitors can view brief Abstracts.

Using Basic Search

Basic searching enables you to search the database for one or more keywords in any field. Use advanced searching if you want to narrow your search by field, collection, or date, or if you want to combine keywords in specific ways.

To perform a basic search:

- On the IEEE Xplore Home page, enter one or more keywords in the **Basic Search** box:

Basic Search

broadband wireless access >>

- Click >>.

If IEEE Xplore asks you to log in: Enter your username and password.

IEEE Xplore looks for matches in any of the following fields: document title, publication title, author, Abstract, index terms, and affiliation. It displays a list of results matching your keyword(s).

- You can view a detailed Abstract by clicking [AbstractPlus](#).
- For articles in publications to which you subscribe, you can view full text by clicking [PDF](#).

The Subscriber icon  indicates articles where you have access to full text.

- You can view multiple pages of results by using the result-range links, such as [26-50](#).

For articles in publications to which you do not subscribe:

- IEEE Members:** You can access full text by filing the documents in your IEEE Member Digital Library File Cabinet (if you subscribe) or by purchasing the documents.
- If you belong to a **subscribing institution:** You can access full text by filing the documents in your institution's IEEE Enterprise File Cabinet (if your institution subscribes) or by purchasing the documents.
- Other guests:** You can access full text by purchasing the documents.

Searching within a Publication

You can use simple keyword searching to locate specific articles or papers in the publication you are browsing. You need to be logged in to IEEE Xplore to perform searching within a publication.

1. Hover on or click  in the navigation menu bar. Then select **Journals & Magazines**, **Conference Proceedings**, or **Standards**. IEEE Xplore displays a list of titles starting with the letter A.
2. Access the publication you want by browsing by keyword or browsing alphabetically.
3. Optional: Click the issue or volume containing the article(s) or paper(s) of interest.
4. To find the articles or papers of interest, enter one or more keywords in the **Search This Publication**, **Search this issue**, or **Search this Conference Proceeding** box.
5. Click .

If IEEE Xplore asks you to log in: Enter your username and password.

IEEE Xplore searches in the following fields for the keyword(s) you entered: document title, publication title, author, Abstract, index terms, and affiliation. It displays a list of results matching your keyword(s)

From the results list, you can view the AbstractPlus or full text of articles.

The Subscriber icon  indicates the articles where you have access to full text.

Using Advanced Search General Procedure

Use advanced search if you want to narrow your search by field, collection, or date, or if you want to combine keywords in specific ways. Advanced Search is available to IEEE members and subscribers.

To perform an Advanced Search:

1. Hover on or click  in the navigation menu bar. Then select **Advanced**.
If IEEE Xplore asks you to log in: Enter your username and password.
IEEE Xplore displays the **Advanced Search** page.
2. Enter your search query using either the structured search (Option 1) or the free-form search (Option 2). When you click , IEEE Xplore displays the results of your search.
3. You can view a detailed Abstract by clicking [AbstractPlus](#).
4. For articles in publications to which you subscribe, you can view full text by clicking [PDF](#).

The Subscriber icon  indicates articles where you have access to full text.

5. You can view multiple pages of results by using the result-range links, such as [26-50](#).

For articles in publications to which you do not subscribe:

- **IEEE Members:** You can access full text by filing the documents in your IEEE Member Digital Library File Cabinet (if you subscribe) or by purchasing the documents.
- If you belong to a **subscribing institution:** You can access full text by filing the documents in your institution's IEEE Enterprise File Cabinet (if your institution subscribes) or by purchasing the documents.
- **Other guests:** You can access full text by purchasing the documents.

Structured Advanced Search (Option 1)

The **Advanced Search** page provides a structured way for you to perform a more complex search. The following procedure assumes you have clicked **SEARCH** in the navigation menu bar and selected **Advanced**.

1. In the Option 1 area, click in the first text box and enter a keyword. The keyword can be a subject term, last name, date, or phrase. If you are unsure of the spelling, you may enter a partial word or name. You may also use wildcards.

IEEE *Xplore* searches for items regardless of capitalization. See "Entering Search Keywords" for additional rules governing entry of search keywords.

2. Limit your search by selecting a choice in the field list next to the text box.



IEEE *Xplore* looks for the search string in all fields unless you select a choice from this list.

3. To include additional words or phrases in the search query, enter search text and select field codes for the other search query boxes as necessary. Define the relationship between the query boxes by selecting search operators from the pull-down menus between the text boxes. For example:

OPTION 1

Enter keywords or phrases, select fields, and select operators

<input type="text" value="broadband wireless access"/>	in	<input type="text" value="Document Title"/>
<input type="text" value="OR"/>	<input type="text" value="bwa"/>	in <input type="text" value="Document Title"/>
<input type="text" value="AND"/>	<input type="text" value=""/>	in <input type="text" value="All Fields"/>

The search operators available in the pull-down menus are:

AND: Searches for records that meet the two conditions it joins.

OR: Searches for records that meet either or both of the two conditions it joins.

NOT: Searches for records that do *not* meet the specified condition.

4. Limit your search results by adjusting the search options. You can:
 - Select publication types
 - Select years to search
 - Organize the format of search results
5. Click . IEEE *Xplore* looks through the citation records and presents a list of results matching your query. The Subscriber icon  indicates articles where you have access to full text.
6. If more titles containing the keyword exist than appear on the first page, click the result-range links, such as [26-50](#), to view more pages of titles.

Limiting a Search to Specific Collections

In advanced search, you can limit your search to a subset of the IEEE *Xplore* collections by selecting the appropriate choices under **Publications**.

Publications

Select publications

- IEEE Periodicals
- IEE Periodicals
- IEEE Conference Proceedings
- IEE Conference Proceedings
- IEEE Standards

Search subscribed content only

IEEE *Xplore* searches in all collections until you specify a subset. It keeps your choice active until you change it.

Institutions that subscribe to certain subset packages can limit search results to only those documents to which they have full access by selecting **Search subscribed content only**.

Limiting a Search to Specific Years

In advanced search, you can limit your search to specific years of publication by selecting the appropriate choices under **Select date range**.

» **Select date range**

Search latest content update (20-January -2005)

From year to

IEEE *Xplore* searches in all publication years until you specify a subset. It keeps your choice active until you change it.

You can limit search results to the most recently added content by selecting **Search latest content update**.

Controlling the Search Results Format

In advanced search, IEEE *Xplore* normally displays your results using the following format specifications:

» **Display Format**

Citation Citation & Abstract

» **Organize results**

Maximum

Display results per page

Sort by

In order

You can change these specifications to view your results in a different format. IEEE *Xplore* keeps your specifications active until you change them.

Your options are:

- **Citation** format consists of document title, author, publication title, and bibliographic information. **Citation & Abstract** format also includes the first 30 to 40 words of the Abstract.
- **Maximum** sets the total number of results found. Choices are 100, 250, and 500.
- **Display...results per page** sets the number of results displayed per page. Choices are 25, 50, and 100.
- **Sort by** sets the criteria for ordering the results. Choices are **Relevance** (how well the result matches the search query as determined by IEEE *Xplore*), **Year** (numerical order by publication year), and **Document Title** (alphabetical, ignoring leading articles such as “a”, “the”, and “an”).
- **In...order** sets the sort order. Choices are **Descending** (high to low) and **Ascending** (low to high).

Free-Form Advanced Search (Option 2)

The **Advanced Search** page enables you to enter a free-form search query. In free-form advanced search, you can specify and perform more complex searches than you can using structured advanced search. You can join more than four search terms, use other operators in addition to **And** and **Or**, and exert more control over the order in which to evaluate expressions.

The following procedure assumes you have clicked **SEARCH** in the navigation menu bar and selected **Advanced**.

1. In the Option 2 area, click in the text box and enter a keyword. The keyword can be a subject term, last name, date, or phrase. If you are unsure of the spelling, you may enter a partial word or name. You may also use wildcards.

IEEE *Xplore* searches for items regardless of capitalization. See "Entering Search Keywords" for additional rules governing entry of search keywords.

2. Limit your search by specifying which field to search in, using the **<in> operator** and a field code as shown in the following syntax:

keyword <in> fieldcode

where **keyword** is your search keyword or phrase and **fieldcode** is a field abbreviation listed in the summary of field codes.

IEEE *Xplore* looks for the keyword in all fields unless you limit the search to specific fields.

3. Combine multiple search expressions as needed. Use operators to define the relationship between search expressions, using the following syntax:

search_expression <operator> search_expression

where **search_expression** is a search string and an optional field specification, and **<operator>** is an operator listed in the summary of search operators.

For example, the following search expression looks for either the phrase **broadband wireless access** or the abbreviation **bwa** in document titles:



OPTION 2

Enter keywords, phrases, or a Boolean expression

```
{broadband wireless access<in>ti} <or>
{bwa<in>ti}
```

Run Search

Reset

4. Limit your search results by adjusting the search options. You can:
 - Select publication types
 - Select years to search
 - Organize the format of search results
5. Click . IEEE *Xplore* looks through the citation records and presents a list of results matching your query. The Subscriber icon  indicates articles where you have access to full text.
6. If more titles containing the keyword exist than appear on the first page, click the result-range links, such as [26-50](#), to view more pages of titles.

Summary of Field Codes

Field codes are elements that identify specific parts of an Abstract record. By limiting a search to a specific field, you can reduce the time it takes to process the search and produce more targeted results. Here are the field codes you can use in search expressions.

Field Name	Field Code
Abstract	ab
Affiliation	cs
All fields	metadata
Author(s)	au
Catalog number	ca
CODEN	cn
Conference date	cy
Document title	ti
Editor(s)	au
Full text	pdfdata
Index term	de
ISBN	in
ISSN	in
Issue number	is
Issue part number	pt
Meeting date	cy
Part number	pt
Publication name	jn
Publication year	pyr
Subject term	de
Title	ti
Volume	vo

Summary of Search Operators

Search operators are elements that express relationships between search terms or search expressions, or that otherwise modify a query. In structured advanced searching, you can use the logical operators **And**, **Or**, and **Not**. In free-form advanced searching, you can use any of the following operators.

Operator	Syntax	Find Results that...
<and>	x <and> y	Match both expressions x and y
<or>	x <or> y	Match either expression x or y or both
<not>	<not> x	Do <i>not</i> match expression x
	x <not> y	Match expression x but <i>not</i> y
<in>	x <in> y	Match expression x in field y .
<paragraph>	x <paragraph> y	Match expressions x and y in same paragraph
<sentence>	x <sentence> y	Match expressions x and y in same sentence.
<phrase>	x <phrase> y	Match expressions x and y in same phrase.
<near>	x <near/y> z	Match expression x within y words of expression z .
<many>	<many> x	Match expression x , with results listed in score order based on density of x .
<order>	<order> x	Match order of terms in expression x .
<thesaurus>	<thesaurus> x	Match synonyms of x as well as x itself.
<wildcard>	<wildcard> `x`	Match variations or patterns. `[xy]` Match any letter x or y . `[^xy]` Match any letter <i>but</i> x or y . `{ab,xy}` Match string ab or xy .
<stem>	<stem> x	Match stem variations of x ; don't score results.
<word>	<word> x	Match x exactly.

Using Author Search

Use author search if you want to find documents by specific authors. Author search is available to IEEE members and subscribers.

To perform an author search:

1. Hover on or click **SEARCH** in the navigation menu bar. Then select **Author**.

If IEEE Xplore asks you to log in: Enter your username and password.

IEEE Xplore displays the **Author Search** page.

2. Enter a last name in the **Quick Find an Author** box and click .

OPTION 1
Quick Find an Author:
 Enter a name to locate articles written by that author.



Example: Enter Lockett S to obtain a list of authors with the last name Lockett and the first initial S.

Note: Use one of the following formats to enter the name. For example, if you want to search for Mary R. Jones:

- Jones (just the last name)
- Jones M (the last name plus one initial, with or without a following period)
- Jones M. R. (the last name plus two initials, each followed by a period and separated with a space)

Make sure that you do NOT use a comma. It is a special query language character.

Note: If you enter a partial last name, IEEE *Xplore* returns a list of last names starting with the letters you entered.

3. Use the  and  buttons to scroll through the results, 50 at a time.
4. Click a name to view a list of articles written by that author. The Subscriber icon  indicates articles where you have access to full text.

You can also browse author names alphabetically.

Browsing Authors Alphabetically

You can look through alphabetical lists of author names in IEEE *Xplore*.

This procedure assumes you have clicked  in the navigation menu bar and selected **Author**.

1. On the Author Search page, click a letter to view author names beginning with that letter.

OPTION 2
Browse alphabetically
 Select a letter from the list.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

IEEE *Xplore* returns a list of the first 50 authors whose last names start with that letter.

2. Use the  and  buttons to scroll through the results, 50 at a time.
3. Click a name to view a list of articles written by that author. The Subscriber icon  indicates articles where you have access to full text.

Formatting Author Names

To find an article written by a particular author, you need to follow the IEEE *Xplore* rules for specifying author names:

- Enter the last name first.
- If you know the first name or initial, enter a space, followed by the *initial*. The period (.) after the initial is optional. Do not enter a comma (,) after the last name and do not enter more than the initial letter of the first name.
- If you know the middle name or initial, enter a space after the first initial, followed by the initial of the middle name, followed by a period (.).
- Asian names appear as provided in the article or paper. If an Asian name includes a non-Asian first name, that part of the name is abbreviated to a first initial.

Examples:

johnson j. w.

Matches **Johnson, J.W.** Does not match **Johnson, J.** (both initials must match) or **Johnson, J.R.**

johnson s.

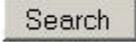
Matches **Johnson, S.** and **Johnson, S.L.** Does not match **Johnson, J.** or **Johnson, J.S.**

CrossRef Search Pilot

CrossRef Search Pilot allows you to search full text of participating publishers' scholarly documents indexed by Google™. Use CrossRef Search Pilot, powered by the Google search engine, to locate content from participating publishers' sites, including IEEE.

Full-text access to articles is determined by each publisher and your institution's subscriptions. CrossRef Search is available to IEEE members and institutional subscribers.

To perform a CrossRef Search:

1. Hover on or click  in the navigation menu bar. Then select **CrossRef**.
If IEEE *Xplore* asks you to log in: Enter your username and password.
IEEE *Xplore* displays the **CrossRef Search Pilot** page.
2. Enter your search query into the search box. When you click , the first page of Google search results appears in a new browser window, grouped by publisher.
3. You can view an article by clicking its title. You may be asked to log in to the publisher's website.
4. You can view multiple pages of results by using the page links.

Result Page: 1 [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) [9](#) [10](#) [Next](#)

For the most comprehensive search of IEEE content, use the IEEE *Xplore* Advanced Search.

Reusing Previous Searches

Your session history lists the search queries you have used since you last logged in to IEEE *Xplore*. You can reuse or modify these search queries. Session history is erased when you log off or your session times out.

To reuse a search query from earlier in your session:

1. Hover on or click **SEARCH** in the navigation menu bar. Then select **Session History**. (On the **Search Results** page, you can also click [View Session History](#).)

Note: If you are asked to log in at this point, your session history will be empty.

IEEE *Xplore* displays the **Search Session History** page, listing search queries you entered earlier in the session. For example:

Search Query Display

Run Search Reset

Recent Search Queries Results

#1	(mimo<in>ti) <and> (ofdm<in>ab)	67
#2	(broadband wireless access<in>ti) <or> (bwa<in>ti)	94

Clear Session History

2. Click the number of the search query you want to reuse. The query appears in the **Search Query Display** box.
3. (Optional) Modify the query as needed in the **Search Query Display** box.
4. Click **Run Search**. IEEE *Xplore* runs the search and displays the results page.

The Subscriber icon  indicates articles where you have access to full text.

Tips for Effective Use of Search

Ideally the first query you enter for your search yields the results you want. Typically, you need to reformulate your searches to get the best results. Here are guidelines and strategies for improving search results:

- Entering Search Keywords
- Revising a Search
- Searching for an Exact Word or Phrase
- Searching with Wildcard Characters
- Specifying Multiple Criteria
- Nesting Search Operations
- Searching with Incomplete Information
- Narrowing a Search
- Broadening a Search

Entering Search Keywords

The following conventions govern how you enter search keywords:

- **Capitalization:** IEEE *Xplore* searches for items regardless of capitalization.
- **Keyword phrases:** IEEE *Xplore* interprets multiple keywords as a phrase.
- **Stem variations:** IEEE *Xplore* looks for plural and suffixed forms of any keywords entered. For example, if you enter **cable**, IEEE *Xplore* also looks for words like **cables** and **cabling**. See “Searching for an Exact Word or Phrase” if you do not want IEEE *Xplore* to search for variations.
- **Punctuation:** IEEE *Xplore* ignores most punctuation. For example, if you search for **solid-state**, IEEE *Xplore* looks for “solid-state”, “solid state”, and “solid_state”, as well as any other occurrences of “solid state” with punctuation between the two words.
- **Special characters:** In IEEE *Xplore*, the following characters have special meaning in free-form search queries, so do not use them in your search keywords:

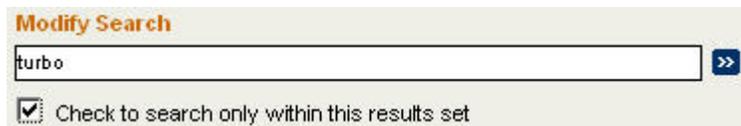
, () @ [] { } < >

Revising a Search

If the search results you receive from using Advanced Search consist of too many or too few documents, you can revise the search query to improve the results. Below are ways to revise the search query. See [Narrowing a Search](#) and [Broadening a Search](#) for strategies on improving search queries.

To search within the current search results:

- Enter additional keywords into the **Modify Search** box, click the checkbox for **Check to search only within this results set**, and click . For example:



The screenshot shows a 'Modify Search' section. At the top, the text 'Modify Search' is displayed in orange. Below it is a text input field containing the word 'turbo'. To the right of the input field is a blue button with a white right-pointing arrow. Below the input field is a checkbox that is checked, with the label 'Check to search only within this results set'.

To modify the existing search query:

- Return to your original search page using your browser’s **Back** button and edit the search query.

To start a new search:

- Enter a new query in the text box on the search results page and click .

or

- Click [New Search](#) on the search results page to display a blank Advanced Search page, where you can enter a new query.

Searching for an Exact Word or Phrase

To search for an exact match, enter the search word or phrase in quotation marks. For example, if you enter the following search word:

“cable”

IEEE *Xplore* looks for matches in any record containing the exact word *cable* in any field. It does not look for *cables*, *cabled*, or *cabling*.

Notes:

- If the text contains punctuation, replace each punctuation mark with a space.
- You cannot use the wildcard characters ? and * within the quotation marks.
- IEEE *Xplore* matches the text you enter only if the record contains that text as a whole word or series of whole words. It does not match text within a word. (To match text within a word, use wildcard characters outside the quotation marks.)

Searching with Wildcard Characters

To search for words that have spelling variations or contain a specified pattern of characters, use ? and * (called wildcard characters) to represent the variations.

- ? Represents any single alphanumeric character in the position it occupies.
- * Represents zero, one, or multiple alphanumeric characters in the position it occupies.

Notes:

- The ? wildcard can appear at the beginning of a word, in the middle of a word, or at the end of a word.
- The * wildcard can appear at the end of a word to find words with different endings, or in the middle of a word to find words containing a specified pattern of characters. The * wildcard can *not* appear at the beginning of a word.
- You cannot use ? or * within quotation marks when you specifying an exact match.
- Wildcard matching must match all characters explicitly specified. If you enter the keyword **cable**, IEEE *Xplore* also looks for records containing the stem variation **cabling**. If you enter **cable***, IEEE *Xplore* does not match **cabling**, because there is no **e** to match.
- The * wildcard can match words that are not the stem variations that normal IEEE *Xplore* searching matches. For example, **cable*** matches *cableguns* and *cableway*, but **cable** does not; it matches words with common suffixes such as **-ed**, **-es**, and **-ing**.

Examples:**cable?**

Matches any record containing six-character words such as *cables* or *cabled* in any field. Does not match *cable* (? must match one character), *cabling*, *cableguns*, or *cableway*.

t?re

Matches any record containing four-character words such as *tire*, *tyre*, or *tore* in any field. Does not match *tires* or *three*.

???agon

Matches *hexagon* or *paragon*. Does not match *pentagon*.

t?re*

Matches *tire* (in which * matches no characters), *tyre*, *tires*, *tyres*, *three*, and *threshold*.

m*n*

Matches *man*, *mean*, *median*, *moon*, *magnification*, *modification*, *management*, *mnemonic*, and any other word in which **m** is followed by **n**.

electro*

Matches *electron*, *electrons*, *electronic*, *electronics*, *electromagnetic*, *electromechanical*, *electrostatic*, and *electrolyte*.

optic* <in> de

Matches records containing *optic*, *optics*, or *optical* in the Index Terms field.

C37.2*

Matches records containing *C37.20.2-1993*, *C37.20.2b-1994*, or *C37.26-1972* (IEEE standards).

Specifying Multiple Criteria

If you are searching for documents meeting any of several criteria, you need to define the relationship between your search strings using search operators. The following examples assume you are using structured Advanced Search (Option 1).

Specifying a combination of criteria:

To search for articles meeting a combination of criteria (for example, articles jointly written by M. Delgado and M.A. Vila), select the **And** operator to combine items. Your search results will list all articles meeting all criteria you specify. For example:

delgado m	in	Author
AND		
vila m.a.	in	Author

Specifying either of several criteria:

To search for documents meeting any one of the criteria, select the **Or** operator to combine items. Your search results will list all documents containing any of the items you specify. For example:

broadband wireless access	in	Abstract
OR		
bwa	in	Abstract

In this example, IEEE *Xplore* finds documents that contain either the phrase **broadband wireless access**, or the abbreviation **BWA**, in the Abstract field.

Specifying the exclusion of criteria:

If you want to exclude an item from your search, use the **Not** operator. Your search results will include those documents that meet the first criteria, but exclude the second. For example:

<input type="text" value="acoustic imaging"/>	in	<input type="text" value="All Fields"/>
<input type="text" value="NOT"/>	<input type="text" value="water"/>	<input type="text" value="All Fields"/>

In this example, IEEE *Xplore* finds documents that contain the phrase **acoustic imaging** in any field, but not the word **water**.

Nesting Search Operations

When a search query consists of multiple operations, you want to make sure IEEE *Xplore* performs the operations in the order you intend.

In Structured Advanced Search:

In structured Advanced Search (Option 1), the order of search operations is governed by the order of criteria in the search query boxes. If you use all three search query boxes, the expression formed by the first two boxes takes precedence over the entry in the third box (in other words, the first operator has precedence over the second).

For example, if you want to find all articles on **MIMO** written by both S. Haykin and K. Huber, you would enter the following search selections:

<input type="text" value="mimo"/>	in	<input type="text" value="All Fields"/>
<input type="text" value="AND"/>	<input type="text" value="haykin s"/>	<input type="text" value="Author"/>
<input type="text" value="AND"/>	<input type="text" value="huber k"/>	<input type="text" value="Author"/>

However, suppose you want to find articles by either of these authors about **MIMO**. If you specify:

<input type="text" value="mimo"/>	in	<input type="text" value="All Fields"/>
<input type="text" value="AND"/>	<input type="text" value="haykin s"/>	<input type="text" value="Author"/>
<input type="text" value="OR"/>	<input type="text" value="huber k"/>	<input type="text" value="Author"/>

IEEE *Xplore* finds articles by Haykin about **MIMO**, and all articles by Huber regardless of subject. That is, IEEE *Xplore* processes **And** operations first. (If you specify the **Or** condition first, using separate boxes, IEEE *Xplore* still processes the **And** operation first.) To instruct IEEE *Xplore* to process an **Or** operation before an **And** operation, enter the entire **Or** expression into a single box, using the <or> operator as follows:

<input type="text" value="haykin s <or> huber k"/>	in	<input type="text" value="Author"/>
<input type="text" value="AND"/>	<input type="text" value="mimo"/>	<input type="text" value="All Fields"/>
<input type="text" value="AND"/>	<input type="text" value=""/>	<input type="text" value="All Fields"/>

This search query finds documents written by either Haykin or Huber (or both) that contain **MIMO** in any field.

In Free-Form Advanced Search:

In the free-form Advanced Search (Option 2), use parentheses to group elements as operations and to specify which operations take place before others. For example, in the search query:

```
mimo <and> ((Haykin S <in> au) <or> (Huber K <in> au))
```

IEEE *Xplore* performs the **In** operations first, the **Or** operation second, and the **And** operation third. That is, it looks for records containing either **Haykin S** or **Huber K** in the author field, plus the word **MIMO** in any field. Without the parentheses, the search query would be:

```
mimo <and> Haykin S <in> au <or> Huber K <in> au
```

In this case, IEEE *Xplore* looks for documents about **MIMO** by **Haykin** and all documents by **Huber**, regardless of subject. It processes the search query from left to right, as if parentheses surrounded “mimo <and> Haykin S <in> au”.

Searching with Incomplete Information

Here are some tips when you have limited information with which to begin a search, but want to minimize the time you spend searching.

If you do not know the exact spelling of an author’s name:

- Using Author Search, type the beginning letters of the author’s name in the **Quick Find** box. Click  and scan the resulting author list for a name you recognize.

or

- Using Advanced Search, type as many letters as you know of the author’s name in the first text box, and use wildcard characters to specify letters you do not know or are unsure of. Then click  and scan the search results for a name you recognize.

If you do not know the full title of a publication:

- Select the collection (**Journals**, **Conference Proceedings**, or **Standards**) under  in the navigation menu bar. Type as many words as you know from the publication title in the **Browse by keyword** box. Click  and scan the results list for a title you recognize.

or

- Using Advanced Search, type as many words as you know from the publication title in the first text box and select **Publication Title** from the pull-down menu. Then select the **Or** operator, and enter keywords appropriate to your search in the second text box. Click  and scan the search results for a title you recognize.

Narrowing a Search

Your first search attempt might produce a long list of results. To reduce the number of results and improve their relevance, you can narrow your search criteria in the following ways:

- Read the citations of relevant titles, looking for additional keywords related to your search. Then modify your search query to include those additional keywords.
- Select a specific collection or date range.
- Analyze the results list for relevant titles, and note recurring authors or publications. Then add an author or publication keyword to your search query using the **And** operator. (See Specifying Multiple Criteria.)

Note: Observe the guidelines for nesting search operations when you combine **Or** and **And** operators.

Broadening a Search

If IEEE *Xplore* finds few or no documents matching your criteria, you can broaden your search criteria to find more matches. Try these techniques:

- Search in full text:



- Add an alternative search term to your original specification, using the **Or** operator. (See Specifying Multiple Criteria.)
- Use truncation and the * wildcard character to specify additional variations of a search term.

Example: To find documents about **photosensitive** materials or **photosensitivity**, you can specify:

photosensitiv*

IEEE *Xplore* returns all matches containing words that begin with **photosensitiv**.

- Use the ? wildcard character to specify a single unknown or varying character in your search term.

Example: Suppose you know that someone named Gardner or Gartner wrote an article about the use of robots. You can specify **robots** for the subject term, and for the author you can specify:

Gar?ner

IEEE *Xplore* returns all documents about robots written by either Gardner or Gartner.

Working with Search Results

The Search Results page lists descriptions of documents that meet your search criteria. This page appears following a search using Basic Search, Advanced Search, Author Search, or Searching within a Publication.

The top of the Search Results page provides a search results summary. For example:

Results for "wireless standards <in> (tijn,au,ab,cs)"  
 Your search matched 93 of 1013592 documents.
 A maximum of 100 results are displayed, 25 to a page, sorted by Relevance in Descending order.

Order of search results: Search results are organized by relevance in descending order with 25 results per page. Users who log in can change these settings on the Advanced Search page under **Organize results**.

Format of search results: The Citation display format includes the document title, author(s)/editor(s), the publication title, and page numbers. Users who log in can select Citation & Abstract under **Display Format**, which displays 30 to 40 words of the document Abstract with each result.

Full-text access: The Subscriber icon  indicates documents where you have access to full text.

Collection descriptor: The last line of each result identifies the publisher of the document (IEEE or IEE), tells you whether a document appears in a journal (JNL), conference proceeding (CNF), or standard (STD), and provides choices for viewing the document content.

From the Search Results page, you can:

All visitors:

- Print the search results. Use the  printer friendly button to display just the search results for printing.
- Email the search results. Use the  e-mail button to open a separate **Email an IEEE Xplore Page** window. Fill in the fields and click .
- View multiple pages of results by using the result-range links, such as [26-50](#).
- View the Abstract of a specific article by clicking the [Abstract](#) link.
- For articles to which you do not have access:

IEEE Members: You can access full text by filing the documents in your IEEE Member Digital Library File Cabinet (if you subscribe) or by purchasing the documents.

If you belong to a **subscribing institution:** You can access full text by filing the documents in your institution's IEEE Enterprise File Cabinet (if your institution subscribes) or by purchasing the documents.

Other guests: You can access full text by purchasing the documents.

Institutional Subscribers and IEEE Members (login or access authentication required):

- View more detail for all results by choosing Citation & Abstract under **Display Format**.
- Select specific results to view on a separate page by clicking the checkbox () before items and then clicking **View Selected Items**. The View Selected Items page appears, listing your selected search results in the Citation & Abstract format.
- If you have full-text access to all results on the page, the **Download Citations** choice appears. You can download citations for all items on the page.
- View the extended Abstract record for a document by clicking [AbstractPlus](#).
- Revise your search specification to generate broader or narrower results using the **Modify Search** query box.
- View a list of previous searches conducted during the current login session by clicking [View Session History](#). You can use this list to repeat a search.
- Start a new search by clicking [New Search](#).

Subscribers to the publication:

- View the list of references contained in a document by clicking [References](#). The list of references opens in a separate page.
- View the full text of a document to which you or your institution subscribes by clicking [PDF](#). If IEEE does not hold copyright to the document or the document is not available in IEEE *Explore*, instead of this link you will see [\[Buy Via Ask*IEEE\]](#), which you can click to purchase the document.

Viewing Selected Search Results

The View Selected Items page displays a subset of your search results. To return from this page to your full search results, click [View Search Results](#).

From the View Selected Items page, you can:

Institutional Subscribers and IEEE Members (login or access authentication required):

- Print the page. Use the  printer friendly button to display just the selected results for printing.
- Email the list of selected items. Use the  e-mail button to open a separate **Email an IEEE *Xplore* Page** window. Fill in the fields and click **Send**.
- View the extended Abstract record for a document by clicking [AbstractPlus](#).

- For articles to which you do not have access:
 - IEEE Members:** You can access full text by filing the documents in your IEEE Member Digital Library File Cabinet (if you subscribe) or by purchasing the documents.
 - If you belong to a **subscribing institution:** You can access full text by filing the documents in your institution's IEEE Enterprise File Cabinet (if your institution subscribes) or by purchasing the documents.
 - Other guests:** You can access full text by purchasing the documents.
- If you have full-text access to all results on the page, the **Download Citations** choice appears. You can download citations for all items on the page.

Subscribers to the publication:

- View the list of references contained in a document by clicking [References](#). The list of references opens in a separate page.
- View the full text of a document to which you or your institution subscribes by clicking [PDF](#). If IEEE does not hold copyright to the document or the document is not available in IEEE *Explore*, instead of this link you will see [\[Buy Via Ask*IEEE\]](#), which you can click to purchase the document.

Adjusting the Search Results Format

On the search results page, users who log in can adjust the search results format by choosing between the **Citation** format and the **Citation & Abstract** format.

Display Format: Citation Citation & Abstract

- The **Citation** format displays the document title, author(s)/editor(s), the publication title, and page numbers.
- The **Citation & Abstract** format displays 30 to 40 words of the document Abstract with each result.

To change the sort order or number of results per page, click your browser **Back** button and make the appropriate selections under **Organize results**. Then click  to repeat the search with the format adjustments.