**摘 要**

**1 摘要的内容**

       一篇论文的摘要应该是以最少的文字写出论文的创新之处，尽量让读者全面了解论文的精华，达到引导读者阅读和引用，发挥研究成果的作用，扩大作者的学术影响。其本质就是一篇独立于全文高度浓缩的短文，所以其构成与论文主体的IMRAD结构是对应的，即大致包括引言、 材料与方法、结果和讨论等主要方面。一般由**研究目的**、**问题描述**、**方法**、**结果**、**结论**五要素组成。

**研究目的**是论文研究、研制、调查等所涉及的具体的主题范围，体现论文的研究内容、要解决的主要问题，是问题的提出、研究方向的确立与目标的定位。

**问题描述**是指作者想解决什么问题，工作的范围是什么（一个通用的方法还是一个特定情况下使用的方法），注意不要使用太多的术语。在大多数读者已经理解为什么这个问题很重要的情况下，可以放在研究目的之前陈述。

**方法**是论文对研究对象进行研究的过程中所运用的原理、理论、条件、材料、工艺、结构、手段、程序，以及研究的基本设计、样本的选择、开展研究的单位、研究对象的信息、处置方法、实验过程等，是完成研究对象的必要手段。

**结果**是作者运用研究方法对研究对象进行实验、研究所得到的结果、效果、数据、被确定的关系等，是进行科学研究所得的成果。

**结论**是作者对结果的分析、研究、比较、评价、应用、提出的问题等，是结果的总结，显示研究结果的可靠性、实用性、创新性，体现论文研究的价值与学术水平，是决定论文被检索的窗口。

**2  英文摘要**

（1）英文摘要的时态

在科技论文摘要中，谓语动词常用的时态有4种：[一般现在时、](http://baike.baidu.com/view/360594.htm%22%20%5Ct%20%22_blank)[一般过去时、现在完成时和一般将来时，根据每句话的具体需要，恰当地使用。其中，一般现在时和一般过去时用得比较多。](http://baike.baidu.com/view/191061.htm)

[一般现在时，用于论述理论部分，说明研究目的，介绍研究内容，提出设想和建议及所得结论等。例如，只要是This paper作主语，习惯上其谓语动词都用现在时。This means that…中的mean“意味着（表明）”是作者写论文时的观点或认识，尽管文中试验结果或数据系过去时间的客观状况，应该用现在时。类似的有The result shows(reveals)…/It is found that…/The conclusions are…/The author suggests…。另外，涉及到公认事实、自然规律、永恒真理等，当然也要用一般现在时。](http://baike.baidu.com/view/360594.htm)

[一般过去时，用于叙述过去的研究，如过去某一时刻(时段)的发现、某一研究过程(实验、观察、调查等过程)。需要指出的是，用一般过去时描述的发现、现象，往往是尚不能确认为自然规律、永恒真理的，而只是当时如何如何；所描述的研究过程也明显带有过去时间的痕迹。](http://baike.baidu.com/view/191061.htm)

完成时少用，但不是不用。说明论题的发展背景，介绍业已结束的研究项目，用[现在完成时；而讨论研究项目所基于的理论，讲述在本研究之后准备要做的行为或预期的结果，用一般将来时。用](http://baike.baidu.com/view/191047.htm)[过去完成时可用来表示过去某一时间以前已经完成的事情，或在一个过去事情完成之前就已完成的另一过去行为。](http://baike.baidu.com/view/201153.htm)

（2）英文摘要的语态

科技论文的英文摘要采用何种语态，既要考虑摘要的特点，又要满足表达的需要。一篇摘要很短，尽量不要随便混用，也不要在一个句子里混用，更不要笼统地“尽量用主动语态”或者“都用被动语态”，要不然文章会显得呆板。

[主动语态。现在主张摘要中](http://baike.baidu.com/view/1403041.htm)[谓语动词尽量采用主动语态的越来越多，因其有助于文字清晰、简洁及表达有力。如The author systematically introduces…就比…are introduced systematically语感要强。必要时，The author systematically都可以去掉，而直接以Introduces开头。](http://baike.baidu.com/view/330413.htm)

[被动语态。论文所涉及的试验、调查、分析、研究、检验等均强调其过程和结果，一般均应采用被动语态来描述。理由是科技论文主要是说明事实经过，至于那件事是谁做的，无须一一证明。事实上，在指示性摘要中，为强调动作承受者，还是采用被动语态为好。即使在报道性摘要中，有些情况下被动者无关紧要，也必须用强调的事物做主语。](http://baike.baidu.com/view/135.htm)

（3）英文摘要的人称

摘要突出的是客观事实，除了用被动语态，人们还常用第三人称作主语来淡化个人主观色彩。现在也有用第一人称复数形式代词“we”,但一般不用单数第一人称作主语，以显示摘要的客观性。也有倾向于采用更简洁的[被动语态或原形动词开头，如To describe，To study，To investigate，To assess，To determine等。](http://baike.baidu.com/view/135.htm%22%20%5Ct%20%22_blank)

例如，某论文摘要的片段如下：We use the Total Ozone Mapping Spectrometer (TOMS) sensor on the Nimbus 7 satellite to map the global distribution of major atmospheric dust sources with the goal of identifying common environmental characteristics.… With such knowledge we will be better able to improve global dust models and to assess the effects of climate change on emissions in the future.

   （4）SCI论文摘要实例

论文“Adaptive Kalman Filtering for INS/GPS”（Journal of Geodesy，DOI：10.1007 /s001900050236）提供的摘要如下：

**After reviewing**the two main approaches of adaptive Kalman filtering, namely, innovation-based adaptive estimation (IAE) and multiple-model-based adaptive estimation (MMAE), **the detailed development of** an innovation-based adaptive Kalman filter for an integrated inertial navigation system/global positioning system (INS/GPS) **is given**. The developed adaptive Kalman filter is based on the maximum likelihood criterion for the proper choice of the filter weight and hence the filter gain factors. **Results**from two kinematic field **tests** in which the INS/GPS **was compared to** highly precise reference data **are presented**. **Results show that** the adaptive Kalman filter outperforms the conventional Kalman filter by tuning either the system noise variance–covariance (V–C) matrix‘Q' or the update measurement noise V–C matrix‘R’or both of them.

论文“Northern hemisphere temperatures during the past millennium: Inferences, uncertainties, and limitations”（Geophysical Research Letters，DOI：10.1029 / 1999GL900070）提供的摘要如下：

**Building on** recent studies, **we attempt** hemispheric temperature reconstructions with proxy data net works for the past millennium. **We focus** **not** just **on** the reconstructions，**but** the uncertainties therein，and important caveats. Though expanded uncertainties prevent decisive conclusions for the period prior to AD 1400, **our results suggest that**the latter 20th century is anomalous in the contest of at least the past millennium. The 1990s was the warmest decade, and 1998 the warmest year, at moderately high levels of confidence. The 20th century warning counters a millennial-scale cooling trend which is consistent with long-term astronomical forcing.

论文“Overview of the radiometric and biophysical performance of the MODIS vegetation indices”（Remote Sensing of Environment，DOI：10.1016/S0034-4257（02）00096-2）提供的摘要如下：

**We evaluated**the initial 12 months of vegetation index product availability from the Moderate Resolution Imaging Spectroradiometer (MODIS) on board the Earth Observing System-Terra platform. Two MODIS vegetation indices (VI), the normalized difference vegetation index (NDVI) and enhanced vegetation index (EVI), are produced at 1-km and 500-m resolutions and 16-day compositing periods. **This paper presents** an initial analysis of the MODIS NDVI and EVI performance from both radiometric and biophysical perspectives. **We utilize** a combination of site-intensive and regionally extensive approaches **to demonstrate**the performance and validity of the two indices. **Our results showed**a good correspondence between airborne-measured, top-of-canopy reflectances and VI values with those from the MODIS sensor at four intensively measured test sites representing semi-arid grass/shrub, savanna, and tropical forest biomes. Simultaneously derived field biophysical measures also demonstrated the scientific utility of the MODIS VI. Multitemporal profiles of the MODIS VIs over numerous biome types in North and South America well represented their seasonal phenologies. **Comparisons of** the MODIS-NDVI **with** the NOAA-14, 1-km AVHRR-NDVI temporal profiles **showed that** the MODIS-based index performed with higher fidelity. The dynamic range of the MODIS VIs **are presented** and their sensitivities in discriminating vegetation differences **are evaluated** in sparse and dense vegetation areas. **We found** the NDVI to asymptotically saturate in high biomass regions such as in the Amazon while the EVI remained sensitive to canopy variations.

论文“Automated GPS processing for global total electron content data”（ GPS Solutions，DOI: 10.1007/s10291-006-0029-5）提供的摘要如下：

A software package known as MIT Automated Processing of GPS (MAPGPS) has been developed to automate the processing of GPS data into global total electron density (TEC) maps. **The goal of**the MAPGPS software **is to produce**reliable TEC data automatically, although not yet in real time. Observations are used from all available GPS receivers during all geomagnetic conditions where data has been successfully collected. **In this paper, the architecture of** the MAPGPS software **is described**. Particular attention **is given to** the algorithms used to estimate the individual receiver biases. One of the largest sources of error in estimating TEC from GPS data is the determination of these unknown receiver biases. The MAPGPS approach to solving the receiver bias problem uses three different methods: minimum scalloping, least squares, and zero-TEC. These methods **are described in detail**, along with their relative performance characteristics. **A brief comparison of** the JPL **and**MAPGPS receiver biases **is presented**, and a possible remaining error source in the receiver bias estimation **is discussed**. **Finally**, the Madrigal database, which allows Web access to the MAPGPS TEC data and maps, **is described**.

**3 英文摘要的句型库**

要写好摘要，需要建立一个适合自己需要的句型库（下面选择的词汇来源于SCI高被引论文）：

对象部分：回顾研究背景，常用词汇有review，summarize，present，outline，describe等；说明写作目的，常用词汇有purpose，attempt，aim。常用句法有We attempt to…，To investigate…，With the aim to…，For purposes of…，Emphasisis on…，Attention is paid to…，…is focused on…,The purpose of this report is to present…等。

方法部分：介绍研究或试验过程，常用词汇有test study，investigate，examine，experiment，discuss，consider，analyze，analysis等；说明研究或试验方法，常用词汇有measure，estimate，calculate等；介绍应用、用途，常用词汇有use，apply，application等。常用句法有…was measured by using…，by means of…，…is calculated according to formula…，…is applied to…，…is used to…等。

结果部分：展示研究结果，常用词汇有show，result，present等；介绍结论，常用词汇有summary，introduce，conclude等。常用句法有The results show (reveal) that…， A case study analysis of a rural site shows that…，our results suggest that…等。

讨论部分：陈述论文的论点和作者的观点，常用词汇有suggest，report，present，expect，describe等；说明论证，常用词汇有support，provide，indicate，identify，find，demonstrate，confirm，clarify等；推荐和建议，常用词汇有suggest，suggestion，recommend，recommendation，propose，necessity，necessary，expect等。常用句法有The conclusions are drawn that…，…is summarized等。

**4 英文摘要精炼的方法**

国际重要检索系统通常采用英语，它们在收录一篇论文摘要时，主要看英文摘要写得好不好，所以提高英文摘要的质量非常关键。

（1）取消不必要的字句，如It is reported…，Extensive investigation show that…，The authors discussed…，This paper concerned with…，以及文摘开头的In this paper…。

（2）去掉背景情况介绍以及过去的研究工作，只表示新情况，新内容；去掉评价性语句以及需继续研究的内容。

（3）在不破坏原意的情况下尽量简化一些措词和重复的单元，如将at a temperature of 100℃ to 105℃写成at 100℃-105℃，将at a high temperature of 1 000℃写成at 1 000℃，将discussed and studied in detail写成discussed，将has been found to increase直接写成increase；

（4）可用动词的情况下尽量避免用动词的名词形式，如将Measurement of thickness of plastic sheet was made写成Thickness of plastic sheers was measured。

（5）在摘要的结果部分描述结果时，可以直接开始描述结果，应当避免使用The results of our study showed that…，It was shown that…，The present study showed that… 等句子。