

**animal feed**

UF fish feed  
 fodder  
 forage  
 silage  
 BT agriculture  
 aquaculture  
 RT crops  
 manufactured products  
 CC A8620U; E3010; E1780  
 DI January 2021

**automotive control**

BT automotive engineering  
 RT automobiles  
 automotive components  
 automotive electronics  
 intelligent transportation systems  
 road traffic control  
 road vehicles  
 traffic engineering computing  
 PT road traffic control  
 CC B8520B; C3360B; C7420;  
 DI January 2021

**blockchains** *[promoted Lead-in]*

UF chain codes (blockchains)  
 permissioned blockchains  
 private blockchains  
 public blockchains  
 BT cryptography  
 distributed databases  
 RT contracts  
 cryptocurrencies  
 data privacy  
 financial data processing  
 Internet of Things  
 peer-to-peer computing  
 PT cryptography  
 distributed databases  
 CC B6120D; C1260C; C4250; C5480; C6130S;  
 C6160B; E0240C; E0410  
 DI January 2021

**chatbots**

UF chat bots  
 BT natural language interfaces  
 RT customer relationship management  
 customer services  
 human computer interaction  
 interactive systems  
 learning (artificial intelligence)  
 natural language processing  
 neural nets  
 social networking (online)  
 Web sites  
 CC C6180N; C6264  
 DI January 2021

**data fusion** *[promoted Lead-in]*

UF data sources  
 BT data handling  
 RT data analysis  
 data integration  
 image fusion  
 remote sensing  
 sensor fusion  
 signal processing  
 soft sensors  
 wireless sensor networks  
 PT data handling  
 CC C6130; C6160  
 DI January 2021

**deep learning (artificial intelligence)** *[promoted LI]*

UF deep neural networks  
 BT learning (artificial intelligence)  
 neural nets  
 RT belief networks  
 convolutional neural nets  
 feature extraction  
 image classification  
 image segmentation  
 learning systems  
 recurrent neural nets  
 supervised learning  
 unsupervised learning  
 PT learning (artificial intelligence)  
 CC C1230D; C1230L; C6260; C6264  
 DI January 2021

**electrostatic discharge protection**

UF ESD protection  
 BT electrostatic discharge protection  
 RT failure analysis  
 integrated circuit technology  
 integrated circuit reliability  
 semiconductor device reliability  
 static electrification  
 atmospheric electricity  
 triboelectricity  
 electric fields  
 electric charge  
 electric potential  
 electric breakdown  
 electrical faults  
 earthing  
 PT electrostatic discharge  
 CC A4110D; B5110; B8140  
 DI January 2021

**food security**

UF food availability  
 BT socio-economic effects  
 RT agricultural products  
 agriculture  
 environmental factors  
 supply and demand  
 sustainable development  
 land use  
 emergency management  
 food products  
 supply chain management  
 supply chains  
 CC E3010; E0230; E0260; E0220  
 DI January 2021

**graph drawing**

BT data visualisation  
 RT computational complexity  
 computational geometry  
 graph theory  
 graphs  
 mathematics computing  
 social sciences  
 knowledge representation  
 CC C1160; C4260; C6130B  
 DI January 2021

**hardware accelerators**

UF hardware acceleration  
 BT microprocessor chips  
 RT AI chips  
 application specific integrated circuits  
 embedded systems  
 field programmable gate arrays  
 graphics processing units  
 reconfigurable architectures  
 system-on-chip  
 CC B1265F; B2570; C5130  
 DI January 2021

**inrush current**

UF switch-on surge  
 input surge current  
 BT electric current  
 RT electric current control  
 electric current measurement  
 electric fields  
 PT electric current  
 CC B8360; B8350  
 DI January 2021

**load monitoring**

BT load management  
 monitoring  
 RT power consumption  
 power system control  
 power system measurement  
 load forecasting  
 load flow control  
 SCADA systems  
 PT load management  
 CC B8110B; C3340H; C7410B  
 DI January 2021

**metaheuristics**

UF metaheuristic algorithms  
 BT optimisation  
 RT ant colony optimisation  
 evolutionary computation  
 genetic algorithms  
 particle swarm optimisation  
 search problems  
 simulated annealing  
 PT optimisation  
 CC B0260; C1180; E0210G  
 DI January 2021

**military control**

BT military systems  
 NT missile control  
 military robotics  
 RT aerospace control  
 aircraft control  
 autonomous aerial vehicles  
 autonomous underwater vehicles  
 command and control systems  
 helicopters  
 marine control  
 military aircraft  
 military computing  
 military equipment  
 military vehicles  
 ships  
 transport control  
 underwater vehicles  
 unmanned surface vehicles  
 weapons  
 wearable robots  
 PT military systems  
 CC B7900; C3375; C3390  
 DI January 2021

**military robotics**

BT military control  
 robots  
 RT aerospace robotics  
 autonomous aerial vehicles  
 autonomous underwater vehicles  
 military aircraft  
 military vehicles  
 mobile robots  
 ships  
 underwater vehicles  
 unmanned surface vehicles  
 weapons  
 wearable robots  
 PT military systems  
 robots  
 CC B7900; C3375; C3360; C3390  
 DI January 2021

**nonorthogonal multiple access**

UF NOMA  
 BT access protocols  
 multi-access systems  
 RT 5G mobile communication  
 cellular radio  
 free-space optical communication  
 MIMO communication  
 optical fibre communication  
 radiofrequency interference  
 PT multi-access systems  
 CC B6150E; B6250; B6260  
 DI January 2021

**plastic pollution**

UF microplastics (environmental)  
 BT pollution  
 plastics  
 RT air pollution  
 aquaculture  
 ecology  
 environmental monitoring (geophysics)  
 food packaging  
 food safety  
 industrial pollution  
 land pollution  
 marine pollution  
 municipal solid waste  
 plastic products  
 river pollution  
 waste management  
 water pollution  
 PT plastics  
 pollution  
 CC A8675; A9220N; A9240Q; A9260T; B7720;  
 C1290B; C3310G; E0230  
 DI January 2021

**ring oscillators**

BT oscillators  
 RT automatic frequency control  
 carcinotrons  
 Chua's circuit  
 frequency stability  
 frequency synthesizers  
 jitter  
 klystrons  
 LC circuits  
 logic gates  
 magnetrons  
 masers  
 mixers (circuits)  
 multivibrators  
 negative resistance  
 phase locked loops  
 resonators  
 tuning  
 voltage-controlled oscillators  
 PT oscillators  
 CC B1230B  
 DI January 2021

**soft sensors**

UF data sources  
 soft sensing  
 software sensors  
 virtual sensing  
 virtual sensors  
 BT computer software  
 RT computerised monitoring  
 data fusion  
 fuzzy systems  
 intelligent sensors  
 Kalman filters  
 learning (artificial intelligence)  
 neural nets  
 observers  
 process control  
 process monitoring  
 production engineering computing  
 sensor fusion  
 sensors  
 virtual instrumentation  
 CC A0650; B7210B; C3240; C7410H; C7480;  
 E0410D  
 specially adapted for specific functions  
 DI January 2021

**spark plasma sintering**

*[promoted Lead-in]*

BT plasma materials processing  
 sintering  
 RT powder technology  
 powders  
 PT plasma materials processing  
 sintering  
 CC A5275R; A8120E; A8120L; B0540; B0580;  
 B8620; E1520J  
 DI January 2021

**spin liquids (magnetism)**

UF spin liquids  
 BT spin systems  
 RT magnetic structure  
 spin dynamics  
 spin fluctuations  
 spin glasses  
 PT spin systems  
 CC A7500  
 DI January 2021

**superparamagnetic materials**

BT magnetic materials  
 RT paramagnetic materials  
 paramagnetism  
 paramagnetic resonance  
 PT paramagnetic materials  
 CC A7520  
 DI January 2021

**unmanned surface vehicles**

ISN marine vehicles only  
 SN2 marine vehicles only  
 UF sail drones  
 ASV  
 autonomous surface vehicles  
 BT marine robots  
 remotely operated vehicles  
 RT boats  
 marine control  
 marine engineering  
 marine navigation  
 military control  
 military robotics  
 ships  
 PT marine robots  
 remotely operated vehicles  
 CC C3360J; C3390C  
 DI January 2021

**virtual power plants**

BT distributed power generation  
RT cloud computing  
power engineering computing  
power system control  
power system management  
PT distributed power generation  
CC B8120K; B8110B; C7410B  
DI January 2021

**wearable sensors**

BT sensors  
RT amperometric sensors  
biomedical equipment  
biomedical telemetry  
biosensors  
body sensor networks  
chemical sensors  
distributed sensors  
electric sensing devices  
force sensors  
humidity sensors  
image sensors  
inductive sensors  
infrared detectors  
intelligent sensors  
magnetic sensors  
microsensors  
microwave detectors  
motion sensors  
nanosensors  
nonelectric sensing devices  
optical sensors  
photodetectors  
pressure sensors  
radiotelemetry  
sensor arrays  
sensor fusion  
sensor placement  
tactile sensors  
temperature sensors  
transducers  
wearable antennas  
wearable computers  
wearable robots  
wireless sensor networks  
PT sensors  
CC A0670D; A8770; B7230; B7510; B7910D;  
C3240  
DI January 2021