

# The MOSEK Release Notes. Version 6.0 (Revision 137).



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# Chapter 1

## Changes and new features in MOSEK

The section presents improvements and new features added to MOSEK in version 6.0.

### 1.1 Compilers used to build MOSEK

MOSEK has been build with the compiler shown in Table 1.1.

Platform	C compiler
linux32x86	Intel C 11.0 (gcc 4.3, glibc 2.3.4)
linux64x86	Intel C 11.0 (gcc 4.3, glibc 2.3.4)
osx32x86	Intel C 11.1 (gcc 4.0)
osx64x86	Intel C 11.1 (gcc 4.0)
solaris32x86	Sun Studio 12
solaris64x86	Sun Studio 12
win32x86	Intel C 11.0 (VS 2005)
win64x86	Intel C 11.0 (VS 2005)

Table 1.1: Compiler version used to build MOSEK

### 1.2 General changes

- A problem analyzer is now available. It generates an simple report with of statisics and information about the optimization problem and relevant warnings about the problem formulation are included.
- A solution analyzer is now available.

- All timing measures are now wall clock times
- MOSEK employs version 1.2.3 of the zlib library.
- MOSEK employs version 11.6.1 of the FLEXnet licensing tools.
- The convexity of quadratic and quadratic constrained optimization is checked explicitly.
- On Windows all DLLs and EXEs are now signed.
- On all platforms the Jar files are signed.
- MOSEK no longer deals with ctrl-c. The user is responsible for terminating MOSEK in the callback.

## 1.3 Optimizers

### 1.3.1 Interior point optimizer

- The speed and stability of interior-point optimizer for linear problems has been improved.
- The speed and stability of the interior-point optimizer for conic problems has been improved. In particular, it is much better at dealing with primal or dual infeasible problems.

### 1.3.2 The simplex optimizers

- Presolve is now much more effective for simplex optimizers hot-starts.

### 1.3.3 Mixed-integer optimizer

- The stopping criteria for the mixed-integer optimizer have been changed to conform better with industry standards.

## 1.4 API changes

- The Mosek/Java API is now built for SUN Java 1.5 and later.
- The Mosek/.NET API is now built for MS .NET 2.0 and later.
- The Mosek/Python API is now based on Python CTypes and uses NumPy instead of Numeric. Python 2.5 and later is supported on all platforms where the `ctypes` module is available.

## 1.5 License system

- The license conditions have been relaxed, so that a license is shared among all tasks using a single environment. This means that running several optimizations in parallel will only consume one license, as long as the associated tasks share a single MOSEK environment. Please note this is NOT useful when using the MATLAB parallel toolbox.

- By default a license remains checked out for the lifetime of the environment. This behavior can be changed using the parameter `MSK_IPAR_CACHE_LICENSE`.
- Flexlm has been upgraded to version 11.6 from version 11.4.

## 1.6 Other changes

- The documentation has been improved.

## 1.7 Interfaces

- The AMPL interface has been augmented so it is possible to pass an initial (feasible) integer solution to mixed-integer optimizer.
- The AMPL interface is now capable of reading the constraint and variable names if they are available.

## 1.8 Platform changes

- MAC OSX on the PowerPC platform is no longer supported.
- Solaris on the SPARC platform is no longer supported.
- MAC OSX is supported on Intel 64 bit X86 i.e. `osx64x86`.
- Add support for MATLAB R2009b.



## Chapter 2

# Limitations and known issues

- Operating system user names containing spaces can result in problems with the license system.
- The interior-point optimizer cannot exploit multiple threads on the Solaris platforms.
- We advise against simultaneously using multiple MOSEK environments within a single program as this might cause problems with the Flexlm licensing system.
- Support for multithreading in the interior-point optimizer is only available MATLAB version R2009B and newer.





## Chapter 3

# Bug fixes and improvements

### 6.0.0.137

- Fixed a bug that caused MOSEK not to check the maximum amount time used when using the mixed integer optimizer.

### 6.0.0.136

- Fixed a bug in the dual simplex optimizer.

### 6.0.0.135

- Fixed a number of bugs in the mixed integer optimizer.

### 6.0.0.133

- Fixed some bugs in the AMPL interface.

### 6.0.0.132

- Added support for conic constraints in the AMPL interface.

### 6.0.0.131

- Fixed a bug occurring under special circumstances in the interior-point optimizer when multiple threads are employed.

**6.0.0.130**

- Some internal changes.

**6.0.0.129**

- Fixed bug in the mixed integer optimizer occurring on some mixed integer conic quadratic problems.

**6.0.0.128**

- Fixed several bugs in the mixed integer optimizer.
- Fixed a bug that would when running one of the interior-point optimizers and using many threads.

**6.0.0.127**

- Fixed a bug in the dual simplex optimizer.

**6.0.0.126**

- Fixed a bug in the primal simplex optimizer.
- Fixed a bug in the dual simplex optimizer.
- Fixed a bug in the presolve.

**6.0.0.125**

- Fixed a recently introduced bug in the network detection procedure.

**6.0.0.124**

- Upgrade FlexLM license software to version 11.10.0.
- Fixed a bug in the network detection procedure.

**6.0.0.123**

- Fixed a bug in the convexity checker.
- Fixed performance issue in the mixed integer optimizer.
- Improved the interior point optimizers for linear problems for certain hard problems.

### 6.0.0.122

- Fixed a bug that made enum values iterable in Python.
- Fixed a problem in the output log.
- Fixed an issue in the mixed integer optimizer.

### 6.0.0.121

- Added support for the MinGW-w64 toolchain on win64x86. The 64-bit applications build with MinGW-w64 should be linked against `libmosek_64_6_0.a`.

### 6.0.0.120

- Fixed a bug in the mixed integer optimizer that caused it to crash in rare cases.
- Added support for Python on the platform osx64x86.

### 6.0.0.119

- Fixed several bugs in the mixed integer optimizer.

### 6.0.0.118

- Fixed a bug in the dual simplex optimizer.

### 6.0.0.117

- Fixed a documentation issue.

### 6.0.0.116

- Fixed an issue in the interior-point optimizer for linear problems.

### 6.0.0.115

- The simplex optimizer did callback too frequently. It has been fixed.

### 6.0.0.114

- Fixed a bug in the concurrent optimizer.
- Fixed a bug in the mixed-integer optimizer.

**6.0.0.113**

- Fixed a bug in the mixed integer optimizer.

**6.0.0.112**

- Removed debug output occurring when reading MOSEK binary task files.
- Fixed a bug in the mixed integer optimizer.

**6.0.0.111**

- Fixed several bugs in the mixed integer optimizer.

**6.0.0.110**

- Fixed several bugs in the mixed integer optimizer.

**6.0.0.109**

- Fixed several bugs in the mixed integer optimizer.

**6.0.0.108**

- Fixed several bugs in the mixed integer optimizer.

**6.0.0.107**

- Fixed several bugs in the mixed integer optimizer.

**6.0.0.106**

- Fixed a bug in the conic optimizer that in special cases made MOSEK report a nonoptimal solution.
- Fixed several bugs in the mixed integer optimizer.
- The Flexlm license system has been downgraded to version 11.9 on Linux due to a bug in flexlm that caused the license manager to use excessive CPU resources.
- A problem running Flexlm license manager under Ubuntu has been discovered. A workaround to this problem is to create a missing directory using the command:

```
sudo ln -s /tmp /usr/tmp
```

### 6.0.0.105

- Fixed a couple of bugs in the graph partitioning based ordering algorithm (employed in the interior-point optimizers).
- Improved the network structure detection capabilities.

### 6.0.0.104

- Fixed a couple of bugs in the graph partitioning based ordering algorithm (employed in the interior-point optimizers).
- Fixed a bug in the basis identification procedure. This bug occurs very rarely.

### 6.0.0.103

- Fixed a bug in the mixed integer optimizer that caused MOSEK to crash in certain cases. This happened only if a very low time limit was used.

### 6.0.0.102

- Fixed a bug in the mixed integer optimizer that caused MOSEK to crash in certain cases.

### 6.0.0.101

- Fixed another issue in the graph partitioning based ordering.

### 6.0.0.100

- Fixed a bug in the graph partition based ordering that in rare cases could cause a crash.

### 6.0.0.99

- Improved the manual.
- Fixed a number of bugs in the mixed integer optimizer.
- Fixed an issue in the presolve occurring very rarely.

### 6.0.0.98

- Fixed a bug causing an assert on very large problems.
- FLEXlm has been upgraded to version 11.9.1 because some bugs in FLEXlm have been fixed.

**6.0.0.97**

- Fixed several issues appearing when the input data had NaNs.
- FLEXlm has been upgraded to version 11.9 because some bugs in FLEXlm has been fixed.

**6.0.0.96**

- Fixed several bugs in the mixed integer optimizer.

**6.0.0.95**

- Fixed several bugs in the mixed integer optimizer.
- Fixed a bug in the conic optimizer causing an assert for certain problems.

**6.0.0.94**

- Fixed a bug in `MSK_analyzeproblem` that could cause a segmentation fault on problems containing cones.

**6.0.0.93**

- Fixed a bug in the Python API array module that caused a segmantation fault under certain circumstances at 64 bit systems.

**6.0.0.92**

- Made some improvement to licensing system.

**6.0.0.91**

- Several bugs in the mixed integer optimizer have been fixed.

**6.0.0.90**

- A rarely occurring issue in Java interface has been fixed.

**6.0.0.89**

- Fixed a few bugs in the mixed integer optimizer.

### 6.0.0.87

- Fixed a performance issue in the interior-point optimizers occurring rarely.
- Fixed a bug in the conic optimizer occurring on problems that has more constraints than variables.

### 6.0.0.86

- Fixed a bug occurring when presolving a solution i.e. only relevant in the hotstart case.
- Fixed several bugs in the mixed integer optimizer.

### 6.0.0.85

- Fixed a several bugs in the mixed integer optimizer.
- Fixed a bug in OPF file writer.
- Fixed a performance issue in the interior-point optimizer occurring very rarely.

### 6.0.0.83

- Improved the performance of the mixed integer optimizer for certain problems.

### 6.0.0.82

- Fixed a bug in the presolve occurring on numerical unstable problems.

### 6.0.0.81

- Improved the section about the MOSEK and MATLAB integration in the toolbox manual.

### 6.0.0.80

- Fixed a bug in the mixed integer optimizer.
- Improved the automatic selection of the simplex optimizer when hot-starting.

**6.0.0.79**

- Fixed a bug in a error message.
- Fixed several bugs in the mixed integer optimizer. In one case the optimizer incorrectly declared a problem infeasible.
- Fixed a bug in the LP writer that occurred when numbers close 1 or -1 occurred.

**6.0.0.78**

- Fixed several bugs the 64bit Python interfaces.
- Fixed a bug in the mixed integer optimizer.

**6.0.0.77**

- Included support for Python 3+.

**6.0.0.76**

- Fixed a bug in the mixed integer optimizer.

**6.0.0.75**

- Fixed an issue in the AMPL binary.

**6.0.0.74**

- Fixed an issue in the basis identification.
- Improved the stability of interior-point optimizer for linear problems.
- Fixed an issue in the mixed integer optimizer.

**6.0.0.73**

- Fixed an issue in the conic interior-point optimizer.

**6.0.0.70**

- Previous versions of MOSEK employed a high resolution timer on Windows. Unfortunately that gave rise to problems on the Amazon EC2 cloud. Therefore, MOSEK is now employing a low resolution timer that does not cause problems.



### 6.0.0.69

- Fixed several issues in the mixed integer optimizer.
- Fixed an issue `MSK_putsolutioni`.

### 6.0.0.68

- Fixed an issue with an assert in the conic optimizer.
- Fixed a performance issue in the presolve.

### 6.0.0.67

- Fixed several bugs in the mixed integer optimizer.
- Fixed a bug in the OPF writer.

### 6.0.0.66

- Improved the interior-point optimizer for linear problems.
- Fixed several bugs in the mixed integer optimizer.
- Fixed a bug that potentially affecting all the interior-point optimizers.

### 6.0.0.65

- Fixed an issue in `MSK_appendcone` that occurs when appending a cone to an empty task.

### 6.0.0.64

- The AMPL modeling shell is updated to version 2010.01. The new version fixes many bugs. New license files are required.
- Improve the stability in the interior-point optimizer for linear problems.

### 6.0.0.63

- Fixed a bug in the mixed integer optimizer.

**6.0.0.62**

- Fixed several bugs in the mixed integer optimizer.
- The problem analyzer is now available when using the MOSEK optimization toolbox for MATLAB.
- Fixed a few typos in the manual.
- Fixed a bug in the presolve.

**6.0.0.61**

- Fixed an issue in the CPU detection affecting new AMD CPU based computers.

**6.0.0.60**

- Fixed a bug in the interior-point optimizer that made it use a lot of space in certain cases during the setup.
- Fixed an issue in the presolve that could cause an assert on near infeasible or badly scaled problems.

**6.0.0.59**

- Fixed several bugs in the AMPL interface.

**6.0.0.58**

- Fixed a bug in the mixed integer optimizer.

**6.0.0.57**

- Include the optimization toolbox for MATLAB on 64 bit OSX.

**6.0.0.56**

- Build the Linux versions on RedHat with glibc 2.3.4 instead of RedHat 5.

### 6.0.0.55

- Fixed a bug that occurs in the presolve on all problems with many more constraints than variables.
- Fixed a bug that occurring when reading a solution into an empty task.
- On some problems dual simplex returned an incorrect dual infeasibility certificate. This issue is fixed.
- A bug regarding detecting primal infeasibility in the network optimizer has been fixed.
- A serious memory overwrite fixed in the simplex network extration module.
- A rarely occuring cycling bug in the primal simplex optimizer has been fixed.
- Fixed a bug in the LU factor module. This affects all the simplex optimizers as well as the basis identification procedure.
- Fixed a performance issue in the mixed integer optimizer.

### 6.0.0.54

- Fixed a bug in the manuals.
- Fixed a bug in the optimization toolbox for MATLAB. The problem occurred if the  $A$  matrix is not a sparse matrix.
- Fixed a bug occurring on certain nonlinear problems.

### 6.0.0.53

- The bug fixes for the mixed integer optimizer mentioned in release 6.0.0.52 had not been included in the release version. They are included in this version.
- Fixed a bug in the mixed integer optimizer occurring on nonlinear problems.

### 6.0.0.52

- Fixed a bug occurring on certain nonlinear problems.
- Fixed a bug in the mixed integer optimizer that caused the log infomation to be wrong.
- Fixed a bug in the mixed integer optimizer that could occur on problems with ranged constraints.
- Fixed a bug occurring when setting `presolve_tol_aj` was set to zero. That is no longer an acceptable value.

**6.0.0.51**

- Fixed a bug the in the MATLAB function `lsqnonneg`.
- Fixed several issues in the mixed integer optimizer.
- Fixed a bug in the linear dependency checker.

**6.0.0.50**

- Fixed a few minor issues in the manual.
- Improved the matrix reordering. The problem `zib01` is an example.
- Fixed an innocent uninitialized read.

**6.0.0.49**

- Fixed some log output issues.
- Updated the Microsoft Solver Foundation documentation and examples.

**6.0.0.47**

- First final release.

**6.0.0.46**

- First several problems in the documentation.

**6.0.0.44**

- First a minor issue in the basis identification.

**6.0.0.43**

- Switched to release candidate mode.

**6.0.0.41**

- Fixed several issues in the simplex optimizers.
- Fixed an issue in the Python interface for win32x86.

#### **6.0.0.40**

- Fixed several issues in the simplex optimizers.

#### **6.0.0.39**

- Improved the problem analyzer.
- Fixed some issues in the mixed integer optimizer.
- Improved the simplex optimizers.

#### **6.0.0.38**

- Removed some debug output.
- Fixed a few minor issues regarding the problem type reporting.
- Fixed a in the presolve causing an assert in sepcial cases.
- Fixed several issues in the mixed-integer optimizer.

#### **6.0.0.37**

- Fixed several problem in the manuals.
- Fixed several bugs in the simplex optimizer.

#### **6.0.0.36**

- Fixed a bug in the problem analyzer.
- Changed the way the licensing is handled internally.

#### **6.0.0.34**

- Fixed several bugs in the mixed-integer optimizer.

#### **6.0.0.33**

- Fixed a bug that could cause an crash in the extreme case.

#### **6.0.0.32**

- Fixed an issue related to the usage of openmp.

**6.0.0.31**

- Fixed several problem in MATLAB optimization toolbox.
- Improved the performance of the dual simplex optimizer.

**6.0.0.30**

- Improved the AMPL interface.

**6.0.0.29**

- Upgraded the compiler on OSX and implemented a workaround for a compiler bug.
- Improved the termination criteria in conic optimizer.

**6.0.0.28**

- Fixed various cosmetic issues.
- Disabled the Python interface for win64x86.

**6.0.0.27**

- Fixed some issues in the manuals.
- Fixed some issues in the Python interface.

**6.0.0.26**

- Fixed some issues in the simplex optimizers.
- Fixed an issue that affected the Solaris 32 bit platforms.

**6.0.0.25**

- Fixed an issue affecting the interior-point optimizers.

**6.0.0.24**

- Fixed an issue regarding termination of the mixed integer optimizer.
- Fixed a few issues in the simplex optimizers.
- Improved the performance of the simplex optimizers.

### **6.0.0.23**

- Fixed a problem in the LP and OPF readers and writers.
- Fixed a few issues in the simplex optimizers.

### **6.0.0.22**

- Fixed a number of bugs in the simplex optimizers.
- The presolve time was reported as zero when the simplex optimizer was used.

### **6.0.0.21**

- Fixed a number of bugs in the simplex optimizers.
- Fixed yet another bug occurring on very large problems when using an interior-point optimizer.

### **6.0.0.20**

- Fixed a number of bugs in the simplex optimizers.
- Fixed a bug occurring on very large problems when using an interior-point optimizer.

### **6.0.0.19**

- Fixed a number of bugs in the simplex optimizers.

### **6.0.0.18**

- Fixed a number of bugs in the simplex optimizers.
- Fixed many bugs in the mixed integer optimizer.
- Fixed several bugs in the conic optimizer.

### **6.0.0.17**

- Fixed a number of problems in the presolve and postsolve.

### **6.0.0.15**

- Fixed a bug in the presolve that could occur on infeasible problems.

**6.0.0.14**

- Fixed a large number of bugs in the simplex optimizers.

**6.0.0.12**

- Fixed several bugs in the presolve.

**6.0.0.10**

- First beta.

**3.1 Mosek/Java API**

- The `mosek.jar` library now requires Java 1.5.
- Interface constants have been replaced with native Java Enums improving type safety for several API methods.