

2025-11-01

E020: Version Control and Git Workflow

DIP-SMC-PSO Educational Series

January 25, 2026

Overview

This episode covers version control and git workflow from the DIP-SMC-PSO project.

Part: Part4 Professional

Duration: 15-20 minutes

Source: Comprehensive Presentation Materials

section0 Intentional Architectural Patterns

****DO NOT "FIX" These Patterns – They Are Intentional:****

- ****Compatibility Layers****
- 'src/optimizer/' → 'src/optimization/' - Backward compatibility for old imports - *Reason:* Smooth migration, no breaking changes
- ****Re-export Chains****
- 'simulation_context.py' in 3 locations - Import path flexibility - *Reason:* User convenience, multiple valid import styles
- ****Model Variants****
- 8 dynamics files (simplified, full, low-rank, etc.) - Different accuracy/performance tradeoffs
- *Reason:* Speed vs. accuracy based on use case
- ****Framework Files in 'src/'****
- 'src/interfaces/hil/test_automation.py' is PRODUCTION code - Automation framework, not pytest tests - *Reason:* Exported in '__init__.py', imported by production code

section0 Directory Placement Rules

****File Classification Decision Tree:****

[Visual diagram - see PDF]

section0 Quality Gates (ENFORCE STRICTLY)

****Production Readiness Criteria:****

Gate	**Threshold**	**Current**
Critical issues	0	[OK]
High-priority issues	3	[OK]
Test pass rate	100 Root visible items	19
[OK] (14)		
Malformed file names	0	[OK]
Code coverage (overall)	85 Coverage (critical)	95 Production score
70/100	(23.9)	

****Research-Ready:**** [OK] Single/multi-threaded operation validated

****NOT Production-Ready:**** Quality gates 1/8 passing (score: 23.9/100)

See: '.ai_workspace/guides/phase4_status.md'

section0 File Naming Conventions

****NEVER Create These Patterns:****

- ****Braces/spaces:**** '{dir/, 'my folder/' - ****Windows device names:**** 'nul', 'con', 'prn', 'aux' - ****Unicode paths on Windows:**** Use ASCII only - ****Trailing dots/spaces:**** 'file. ', 'dir.'

****Recommended Patterns:****

- ****Python modules:**** 'snake_case.py' - ****Classes:**** 'PascalCase' - ****Functions/variables:**** 'snake_case' - ****Constants:**** 'UPPER_SNAKE_CASE' - ****Directories:**** 'lowercase_underscores/'
- ****Scripts:**** 'verb_noun.sh' (e.g., 'run_tests.sh')

Resources

- **Repository:** <https://github.com/theSadeQ/dip-smc-pso.git>
- **Documentation:** See docs/ directory
- **Getting Started:** docs/guides/getting-started.md