## **ROCKY DEM 4.0** General Materials Catalog Interactions Catalog **Extend Simulation** Simulation Restart Simulation S'cheduler Unit System Management Parametric Support (Pre & Post) Compressed Data Storage Linux OS Support Periodic Boundaries Python Scripting **HPC** and Parallel Process Parallel shared memory Solver (HPC licenses required) Single GPU and multiGPU Solver (HPC licenses required) Contact and Physical Models Rolling Resistance Model: Type 1 - Constant rolling resistance model Rolling Resistance Model: Type 3 - Elastic-plastic spring-dashpot resistance model Contact Model (Normal Forces): Linear Hysteresis & Linears Elastic Viscous Contact Model (Tangential Forces): Elastic Coulomb & Coulomb Limit Shear Wear Contour Plots Wear (Surface Wear Modification) Particle Breakage Thermal Model Airflow Model (Lattice Boltzmann) **Geometry Types Custom Inlets** Custom Geometries (import \*.XGL, \*.STL, and \*.DXF Files) Feed Conveyor Parametric Receiving Conveyor Parametric Custom Geometries (import \*.CAS and \*.MSH ANSYS Fluent Files) Movement Rotation Translation Rotation Without Displacement

Translation Without Displacement

Motion Preview

Vibration Pendulum

Periodic Motion  RDOF (Six Degrees of Freedom)  Replicate Geometry  Combined Motions  Particle Types  Spherical Particles  Non-Round Particles  Non-Round Particles  Particle Size Distribution  Adhesive Materials (Wet/Dry/Sticky Contact Rheologies)  Particle Detailed 3D View  Concave Particles  Plexible Particles  Data Export  Export Image  Export Table Data  Export Table Data  Export Curve Data  Colision Data Collection & Export for FEA Analysis (ANSYS Mechanical)  Colision Energy Spectrum  Export Modified Wear Geometry  Quantitative Calculations  Cube Selection  Plane Selection  Plane Selection  Polyhedral Envelope Selection  Property Filter  Residence Time  Particle Tagging  Eulerian Statistics  Particle Fipi Count  Post Processing Tools  3D View  Time Plot  Space Plot  Histogram  Cross Plot  Wideo Animation  Motion Preview  MultiTime Plot  Particle Ispector	
Replicate Geometry Combined Motions Particle Types  Spherical Particles Non-Round Particles Particle Size Distribution Adhesive Materials (Wet/Dry/Sticky Contact Rheologies) Particle Detailed 3D View Concave Particles Plexible Particles Data Export  Export Image Export Table Data Export Table Data Export word Data Colision Data Collection & Export for FEA Analysis (ANSYS Mechanical) Colision Energy Spectrum Export Modified Wear Geometry Quantitative Calculations  Cube Selection Cylinder Selection Polyhedral Envelope Selection Property Filter Residence Time Particle Tagging Eulerian Statistics Particle Time Statistics Particle Fip Count Post Processing Tools  3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	
Particle Types  Spherical Particles  Non-Round Particles  Non-Round Particles  Particle Size Distribution  Adhesive Materials (Wet/Dry/Sticky Contact Rheologies)  Particle Detailed 3D View  Concave Particles  Plexible Particles  Data Export  Export Image Export Table Data Export Table Data Export Curve Data  Colision Data Collection & Export for FEA Analysis (ANSYS Mechanical)  Colision Energy Spectrum  Export Modified Wear Geometry  Quantitative Calculations  Cube Selection  Cylinder Selection  Plane Selection  Property Filter  Residence Time  Particle Tagging  Eulerian Statistics  Particle Filip Count  Post Processing Tools  3D View  Time Plot  Space Plot  Histogram  Kotion Preview  MultiTime Plot  Mitor Preview  MultiTime Plot	
Spherical Particles Non-Round Particles Non-Round Particles Particle Size Distribution Adhesive Materials (Wet/Dry/Sticky Contact Rheologies) Particle Detailed 3D View Concave Particles Flexible Particles Data Export  Export Image Export Table Data Export Curve Data Colision Data Collection & Export for FEA Analysis (ANSYS Mechanical) Colision Energy Spectrum Export Modified Wear Geometry Quantitative Calculations  Cube Selection Cylinder Selection Plane Selection Polyhedral Envelope Selection Property Filter Residence Time Particle Tagging Eulerian Statistics Particle Filp Count  Post Processing Tools  3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	
Spherical Particles  Non-Round Particles  Particle Size Distribution  Adhesive Materials (Wet/Dry/Sticky Contact Rheologies)  Particle Detailed 3D View  Concave Particles  Data Export  Export Image  Export Table Data  Export Table Data  Export Table Data  Export Gurve Data  Colision Data Collection & Export for FEA Analysis (ANSYS Mechanical)  Colision Energy Spectrum  Export Modified Wear Geometry  Quantitative Calculations  Cube Selection  Cylinder Selection  Polyhedral Envelope Selection  Property Filter  Residence Time  Particle Tagging  Eulerian Statistics  Particle Time Statistics  Post Processing Tools  3D View  Time Plot  Space Plot  Histogram  Cross Plot  Video Animation  Motion Preview  MultiTime Plot	
Non-Round Particles Particle Size Distribution Adhesive Materials (Wet/Dry/Sticky Contact Rheologies) Particle Detailed 3D View Concave Particles Plexible Particles Pata Export Export Image Export Table Data Export Curve Data Colision Data Collection & Export for FEA Analysis (ANSYS Mechanical) Colision Energy Spectrum Export Modified Wear Geometry Quantitative Calculations Cube Selection Cylinder Selection Plane Selection Property Filter Residence Time Particle Tagging Eulerian Statistics Particle Filip Count Post Processing Tools 3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Particle Types
Particle Size Distribution Adhesive Materials (Wet/Dry/Sticky Contact Rheologies) Particle Detailed 3D View Concave Particles Plexible Particles Data Export  Export Image Export Table Data Export Curve Data Colision Data Collection & Export for FEA Analysis (ANSYS Mechanical) Colision Energy Spectrum Export Modified Wear Geometry Quantitative Calculations  Cube Selection Cylinder Selection Plane Selection Polyhedral Envelope Selection Property Filter Residence Time Particle Tagging Eulerian Statistics Particle Time Statistics Particle Filp Count  Post Processing Tools  3D View Time Plot Video Animation Motion Preview MultiTime Plot	Spherical Particles
Adhesive Materials (Wet/Dry/Sticky Contact Rheologies) Particle Detailed 3D View Concave Particles Flexible Particles Data Export  Export Image Export Table Data Export Table Data Export Curve Data Colision Data Collection & Export for FEA Analysis (ANSYS Mechanical) Colision Energy Spectrum Export Modified Wear Geometry Quantitative Calculations  Cube Selection Cylinder Selection Polyhedral Envelope Selection Property Filter Residence Time Particle Tagging Eulerian Statistics Particle Time Statistics Particle Time Statistics Particle Time Statistics Particle Time Count  Post Processing Tools  3D View Time Plot Space Plot Histogram Cress Plot Video Animation Motion Preview MultiTime Plot	Non-Round Particles
Particle Detailed 3D View Concave Particles Flexible Particles  Data Export  Export Image Export Table Data Export Curve Data Colision Data Collection & Export for FEA Analysis (ANSYS Mechanical) Colision Energy Spectrum Export Modified Wear Geometry  Quantitative Calculations  Cube Selection Cylinder Selection Polyhedral Envelope Selection Property Filter Residence Time Particle Tagging Eulerian Statistics Particle Time Statistics Particle Filip Count  Post Processing Tools  3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Particle Size Distribution
Concave Particles  Plata Export  Export Image Export Table Data Export Curve Data  Colision Data Collection & Export for FEA Analysis (ANSYS Mechanical)  Colision Energy Spectrum Export Modified Wear Geometry  Quantitative Calculations  Cube Selection  Cylinder Selection  Plane Selection Polyhedral Envelope Selection Property Fitter Residence Time Particle Tagging Eulerian Statistics Particle Time Statistics Particle Flip Count  Post Processing Tools  3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Adhesive Materials (Wet/Dry/Sticky Contact Rheologies)
Export Image Export Table Data Export Table Data Export Curve Data Colision Data Collection & Export for FEA Analysis (ANSYS Mechanical) Colision Energy Spectrum Export Modified Wear Geometry Quantitative Calculations  Cube Selection Cylinder Selection Plane Selection Polyhedral Envelope Selection Property Filter Residence Time Particle Tagging Eulerian Statistics Particle Time Statistics Particle Filp Count  Post Processing Tools 3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Particle Detailed 3D View
Export Image Export Table Data Export Table Data Export Curve Data Colision Data Collection & Export for FEA Analysis (ANSYS Mechanical) Colision Energy Spectrum Export Modified Wear Geometry Quantitative Calculations  Cube Selection Cylinder Selection Plane Selection Polyhedral Envelope Selection Property Filter Residence Time Particle Tagging Eulerian Statistics Particle Time Statistics Particle Filip Count Post Processing Tools 3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Concave Particles
Export Table Data  Export Curve Data  Colision Data Collection & Export for FEA Analysis (ANSYS Mechanical)  Colision Energy Spectrum  Export Modified Wear Geometry  Quantitative Calculations  Cube Selection  Cylinder Selection  Plane Selection  Polyhedral Envelope Selection  Property Filter  Residence Time  Particle Tagging  Eulerian Statistics  Particle Time Statistics  Particle Time Statistics  Particle Time Statistics  Post Processing Tools  3D View  Time Plot  Space Plot  Histogram  Cross Plot  Video Animation  Motion Preview  MultiTime Plot	Flexible Particles
Export Table Data  Export Curve Data  Colision Data Collection & Export for FEA Analysis (ANSYS Mechanical)  Colision Energy Spectrum  Export Modified Wear Geometry  Quantitative Calculations  Cube Selection  Cylinder Selection  Plane Selection  Polyhedral Envelope Selection  Property Filter  Residence Time Particle Tagging  Eulerian Statistics  Particle Time Statistics  Particle Flip Count  Post Processing Tools  3D View  Time Plot  Space Plot  Histogram  Cross Plot  Video Animation  Motion Preview  MultiTime Plot	Data Export
Export Curve Data Colision Data Collection & Export for FEA Analysis (ANSYS Mechanical) Colision Energy Spectrum Export Modified Wear Geometry Quantitative Calculations Cube Selection Cylinder Selection Plane Selection Polyhedral Envelope Selection Property Filter Residence Time Particle Tagging Eulerian Statistics Particle Time Statistics Particle Flip Count Post Processing Tools 3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Export Image
Colision Data Collection & Export for FEA Analysis (ANSYS Mechanical)  Colision Energy Spectrum  Export Modified Wear Geometry  Quantitative Calculations  Cube Selection  Cylinder Selection  Plane Selection  Polyhedral Envelope Selection  Property Filter  Residence Time  Particle Tagging  Eulerian Statistics  Particle Time Statistics  Particle Flip Count  Post Processing Tools  3D View  Time Plot  Space Plot  Histogram  Cross Plot  Video Animation  Motion Preview  MultiTime Plot	Export Table Data
Colision Energy Spectrum  Export Modified Wear Geometry  Quantitative Calculations  Cube Selection  Cylinder Selection  Plane Selection  Polyhedral Envelope Selection  Property Filter  Residence Time  Particle Tagging  Eulerian Statistics  Particle Time Statistics  Particle Flip Count  Post Processing Tools  3D View  Time Plot  Space Plot  Histogram  Cross Plot  Video Animation  Motion Preview  MultiTime Plot	Export Curve Data
Export Modified Wear Geometry  Quantitative Calculations  Cube Selection  Cylinder Selection  Plane Selection  Polyhedral Envelope Selection  Property Filter  Residence Time  Particle Tagging  Eulerian Statistics  Particle Time Statistics  Particle Flip Count  Post Processing Tools  3D View  Time Plot  Space Plot  Histogram  Cross Plot  Video Animation  Motion Preview  MultiTime Plot	Colision Data Collection & Export for FEA Analysis (ANSYS Mechanical)
Cube Selection Cylinder Selection Plane Selection Polyhedral Envelope Selection Property Filter Residence Time Particle Tagging Eulerian Statistics Particle Time Statistics Particle Flip Count Post Processing Tools 3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Colision Energy Spectrum
Cube Selection Cylinder Selection Plane Selection Polyhedral Envelope Selection Property Filter Residence Time Particle Tagging Eulerian Statistics Particle Time Statistics Particle Flip Count Post Processing Tools 3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Export Modified Wear Geometry
Cylinder Selection Plane Selection Polyhedral Envelope Selection Property Filter Residence Time Particle Tagging Eulerian Statistics Particle Time Statistics Particle Flip Count  Post Processing Tools  3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Quantitative Calculations
Plane Selection Polyhedral Envelope Selection Property Filter Residence Time Particle Tagging Eulerian Statistics Particle Time Statistics Particle Flip Count  Post Processing Tools  3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Cube Selection
Polyhedral Envelope Selection Property Filter Residence Time Particle Tagging Eulerian Statistics Particle Time Statistics Particle Flip Count  Post Processing Tools 3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Cylinder Selection
Property Filter Residence Time Particle Tagging Eulerian Statistics Particle Time Statistics Particle Flip Count  Post Processing Tools  3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Plane Selection
Residence Time Particle Tagging Eulerian Statistics Particle Time Statistics Particle Flip Count  Post Processing Tools  3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Polyhedral Envelope Selection
Particle Tagging Eulerian Statistics Particle Time Statistics Particle Flip Count  Post Processing Tools  3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Property Filter
Eulerian Statistics Particle Time Statistics Particle Flip Count  Post Processing Tools  3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Residence Time
Particle Time Statistics Particle Flip Count  Post Processing Tools  3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Particle Tagging
Particle Flip Count  Post Processing Tools  3D View Time Plot  Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Eulerian Statistics
Post Processing Tools  3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Particle Time Statistics
3D View Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Particle Flip Count
Time Plot Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Post Processing Tools
Space Plot Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	3D View
Histogram Cross Plot Video Animation Motion Preview MultiTime Plot	Time Plot
Cross Plot Video Animation Motion Preview MultiTime Plot	Space Plot
Video Animation  Motion Preview  MultiTime Plot	Histogram
Motion Preview  MultiTime Plot	Cross Plot
MultiTime Plot	Video Animation
	Motion Preview
Particle Inspector	MultiTime Plot
	Particle Inspector

Particles Trajectory
Particle Detailed 3D View
External Coupling / Other Physics
ANSYS Workbench Parametric Integration
ANSYS Mechanical 1-Way Coupling (DEM-to-FEA)
ANSYS Fluent 1-Way Coupling (CFD-to-DEM)
ANSYS Fluent 2-Way Coupling
DYNARDO optisLang Integration