WHAT IS CLAIMED IS:

1. A computer-implemented method for generating encoding ladders for encoding media titles, the method comprising:

receiving a plurality of encodings of a media title having different resolutions;

generating a first convex hull of points for a first set of encodings included in the plurality of encodings of the media title, wherein each point included in the first convex hull of points represents an encoding included in the first set of encodings having a same first resolution, wherein the first convex hull of points represents encoding tradeoffs between quality and bitrate when encoding the media title at the same first resolution;

generating a second convex hull of points for a second set of encodings included in the plurality of encodings of the media title, wherein each point included in the second convex hull of points represents an encoding included in the second set of encodings having a same second resolution, wherein the second convex hull of points represents encoding tradeoffs between quality and bitrate when encoding the media title at the same second resolution;

determining an overall convex hull based on the first convex hull of points and the second convex hull of points; and

generating an encoding ladder for the media title based on at least the overall convex hull and a first ladder requirement.

2. The computer-implemented method of claim 1, wherein generating the encoding ladder comprises:

determining a plurality of encoded videos based on the overall convex hull and the first ladder requirement; and

generating a plurality of bitrate-resolution pairs based on the plurality of encoding videos, wherein each of the bitrate-resolution pairs specifies an average bitrate and a resolution of a different encoded video included in the plurality of encoded videos.

3. The computer-implemented method of claim 1, wherein the first ladder requirement comprises a quality saturation requirement, and generating the encoding ladder comprises:

computing a quality saturation bitrate based on the overall convex hull;

selecting a first video bitrate-quality point associated with a first encoded video from the overall convex hull based on the quality saturation bitrate;

generating a first bitrate-resolution pair that specifies an average bitrate of the first encoded video and a resolution of the first encoded video; and

aggregating the first bitrate-resolution pair with a plurality of bitrate-resolution pairs associated with at least a second ladder requirement to generate a portion of the encoding ladder.

4. The computer-implemented method of claim 1, wherein generating the encoding ladder comprises:

selecting a plurality of video bitrate-quality points from the overall convex hull based on a target bitrate spacing specified in the first ladder requirement; and

generating a plurality of bitrate-resolution pairs associated with a plurality of encoded videos based on the plurality of video bitrate-quality points.

5. The computer-implemented method of claim 1, wherein generating the encoding ladder comprises:

determining that none of a plurality of video bitrate-quality points in the overall convex hull satisfies the first ladder requirement;

selecting at least one video bitrate-quality point from the first convex hull of points based on the first ladder requirement;

generating at least one bitrate-resolution pair associated with at least one encoded video based on the least one video bitrate-quality point; and

aggregating the at least one bitrate-resolution pair and a plurality of bitrate-resolution pairs generated based on the overall convex hull to generate a portion of the encoding ladder.

6. The computer-implemented method of claim 1, wherein the first convex hull of points includes a first set of video bitrate-quality points, the second convex hull of points includes a second set of video bitrate-quality points, and the overall convex hull includes at least a first subset of the first set of video bitrate-quality points and a second subset of the second set of video bitrate-quality points.

7. The computer-implemented method of claim 1, wherein generating the first convex hull of points comprises:

encoding each shot included in the media title at the same first resolution and across a plurality of encoding parameter sets to generate a plurality of encoded shots;

performing one or more optimization operations based on the plurality of encoded shots and a visual quality metric to generate a plurality of encoded videos; and

computing a plurality of video bitrate-quality points based on the plurality of encoded videos.

8. The computer-implemented method of claim 7, wherein the visual quality metric comprises a video multimethod assessment fusion metric that estimates perceptual video quality.

9. The computer-implemented method of claim 1, wherein the first ladder requirement specifies at least one of a minimum allowed bitrate, a maximum allowed bitrate, a target bitrate spacing, a minimum visual quality level, or a mandatory resolution.

10. The computer-implemented method of claim 1, wherein a bitrate varies across a first encoded video associated with a first bitrate-resolution pair included in the encoding ladder.

11. One or more non-transitory computer readable media including instructions that, when executed by one or more processors, cause the one or more processors to generate encoding ladders for encoding media titles by performing the steps of:

receiving a plurality of encodings of a media title having different resolutions;

generating a plurality of convex hulls of points for the plurality of encodings of the media title, wherein each convex hull of points included in the plurality of convex hulls of points is generated for a different set of encodings included in the plurality of encodings of the media title, wherein each point included in a given convex hull of points represents an encoding included in a given set of encodings having a given same resolution, and the given convex hull of points represents encoding tradeoffs between quality and bitrate when encoding the media title at the given same resolution;

determining an overall convex hull based on the plurality of convex hulls of points; and

generating an encoding ladder for the media title based on at least the overall convex hull and a first ladder requirement.

12. The one or more non-transitory computer readable media of claim 11, wherein the encoding ladder comprises a plurality of bitrate-resolutions pairs that are associated with a plurality of encoded videos.

13. The one or more non-transitory computer readable media of claim 11, wherein the first ladder requirement comprises a quality saturation requirement, and generating the encoding ladder comprises:

computing a quality saturation bitrate based on the overall convex hull;

selecting a first video bitrate-quality point associated with a first encoded video from the overall convex hull based on the quality saturation bitrate;

generating a first bitrate-resolution pair that specifies an average bitrate of the first encoded video and a resolution of the first encoded video; and

aggregating the first bitrate-resolution pair with a plurality of bitrate-resolution pairs associated with at least a second ladder requirement to generate a portion of the encoding ladder.

14. The one or more non-transitory computer readable media of claim 11, wherein generating the encoding ladder comprises:

selecting a plurality of video bitrate-quality points from the overall convex hull based on a target bitrate spacing specified in the first ladder requirement; and

generating a plurality of bitrate-resolution pairs associated with a plurality of encoded videos based on the plurality of video bitrate-quality points.

15. The one or more non-transitory computer readable media of claim 11, wherein generating the encoding ladder comprises:

determining that none of a plurality of video bitrate-quality points in the overall convex hull satisfies the first ladder requirement;

selecting at least one video bitrate-quality point from a first convex hull of points included in the plurality of convex hulls of points based on the first ladder requirement;

generating at least one bitrate-resolution pair associated with at least one encoded video based on the least one video bitrate-quality point; and

aggregating the at least one bitrate-resolution pair and a plurality of bitrate-resolution pairs generated based on the overall convex hull to generate a portion of the encoding ladder.

16. The one or more non-transitory computer readable media of claim 11, wherein determining the overall convex hull based on the plurality of convex hulls of points comprises:

determining a union of video bitrate-quality points included in the plurality of convex hulls of points;

identifying a boundary associated with the union of video bitrate-quality points, wherein no video bitrate-quality point included in the union of video bitrate-quality points is located on a first side of the boundary; and

discarding any video bitrate-quality point included in the union of video bitrate-quality points that is not located along the boundary.

17. The one or more non-transitory computer readable media of claim 11, wherein generating the plurality of convex hulls of points comprises:

encoding each shot included in the media title at a same first resolution and across a plurality of encoding parameter sets to generate a plurality of encoded shots;

performing one or more optimization operations based on the plurality of encoded shots and a visual quality metric to generate a plurality of encoded videos; and

computing a plurality of video bitrate-quality points based on the plurality of encoded videos to generate a first convex hull of points included in the plurality of convex hulls of points.

18. The one or more non-transitory computer readable media of claim 11, wherein the first ladder requirement specifies at least one of a minimum allowed bitrate, a maximum allowed bitrate, a target bitrate spacing, a minimum visual quality level, or a mandatory resolution.

19. The one or more non-transitory computer readable media of claim 11, wherein a first encoded video associated with a first bitrate-resolution pair included in the encoding ladder comprises at least a first encoded shot that is generated based on a first encoding parameter and at least a second encoded shot that is generated based on a second encoding parameter.

20. A system comprising:

one or more memories storing instructions; and

one or more processors coupled to the one or more memories that, when executing the instructions, perform the steps of:

receiving a plurality of encodings of a media title having different resolutions;

generating a first convex hull of points for a first set of encodings included in the plurality of encodings of the media title, wherein each point

included in the first convex hull of points represents an encoding included in the first set of encodings having a same first resolution based on a visual quality metric and a first plurality of encoded shots associated with both the media title and the same first resolution;

generating a second convex hull of points for a second set of encodings included in the plurality of encodings of the media title, wherein each point included in the first convex hull of points represents an encoding included in the second set of encodings having a same second resolution based on the visual quality metric and a second plurality of encoded shots associated with both the media title and the same second resolution;

determining an overall convex hull based on the first convex hull of points and the second convex hull of points; and

generating an encoding ladder for the media title based on a first ladder requirement and at least one of the overall convex hull, the first convex hull of points, or the second convex hull of points.